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NEWSPAPER

GAO Probing $403 Million SSI Errors

By Nancy Freneh
Of the CW Staff

WASHINGTON, D.C. – Problems with a computerized payment system designed to issue checks to recipients who qualify for the Supplemental Security Income (SSI) program have been blamed for more than $403 million in overpayments over the past 18 months.

This Social Security Administration (SSA) program, which by June 30 had issued $8,075,277,809 in both state and federal funds, is now being scrutinized by the General Accounting Office (GAO) at the request of Sen. Birch M. Bayh (D-Ind.). Findings are expected next month.

Bayh said he believes the overpayment errors "probably will get as high as $1 billion in taxpayers' money" when all studies are completed.

The problems, which apparently defy short-range solutions, seem to have developed from at least five major difficulties, interviews with SSA spokesmen revealed.

First, about 1,300 different sets of files previously maintained by municipal, county and state governments had to be converted for centralized processing by SSA, in compliance with the law. Some may not be perfect yet.

Second, changes in legislation during the pre-implementation period made it necessary to make changes in parts of the system already designed.

Third, a Supreme Court ruling forbade reducing the amount of an individual overpayment without a hearing, regardless of whether the overpayment was a result of a DP error or a change in eligibility, an SSA spokesman said.

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IBM Indicted for Conspiracy to Thwart Bidding

By Nancy French
Of the CW Staff

JERSEY CITY, N.J. – IBM conspired with city officials here to thwart free, open and competitive bidding in order to win the contract for a new computer system, a Hudson County grand jury charged in an indictment handed down here recently.

As evidence, the indictment alleged specifications in the city's request for proposal (RFP) issued on April 3, 1974 described "almost exactly" the characteristics of an IBM 370 system and related software packages.

Further, information for that RFP was provided by IBM employees interested in closing the contract, the indictment charged.

In addition to IBM, the indictment named three current city employees, two former city employees and a bank executive.

The alleged conspiracy began about Sept. 18, 1973 and the RFP for the city's new computer system was issued eight months later.

In a statement, IBM said it was "shocked" at the indictment, particularly since company officials requested an opportunity to testify to assure the grand jury had all the facts needed "to reach a sound decision." IBM said it was "never given" that chance.

A "thorough investigation" has showed some IBM personnel "may have gone too far in an intensive and overzealous sales effort," but there are "absolutely no facts that could lead any reasonable person to conclude that an indictment of criminal conspiracy against IBM was warranted," IBM said.

"There were no bribes, no passing of money, no other unlawful conduct," the company added.

How Grand Jury Saw It

But the grand jury saw it otherwise, and the scenario described in the indictment went as follows:

After IBM was given an exclusive opportunity to make a sales pitch to city officials on Oct. 11, 1973, Peter Korn, former Jersey City business administrator, asked Eugene Josephs, an IBM sales representative, to do a study exploring the feasibility of converting existing computer programs from NCR language to a language compatible with IBM equipment. That study was completed on or about Nov. 19, 1973.

The next day, Korn signed a letter asking IBM to keep an IBM 370/115 on order for the city. The system was actually ordered even before the study was begun, the indictment said.

Sometime thereafter, IBM prepared two drafts of "detailed specifications" for a new computer from which portions were lifted and incorporated verbatim in the RFP placed out of bid on April 3, 1974, the indictment alleged.

(Continued on Page 3)

Univac 1100/10 Set for Mid-Sized Mart

By Patrick Ward
Of the CW Staff

ST. PAUL, Minn. – Univac has entered a lower priced 1100 series mainframe into the mid-size CPU market which, it claimed, offers a wide price/performance margin over IBM, Burroughs and Honeywell equipment.

The minimal 128K-word Univac 1100/10 processor can perform roughly two and one-half times as many operation/sec per $1,000 of purchase price as a similarly sized IBM 370/135, Univac said.

The 128K 1100/10 also comes out ahead of the IBM 370/145, Honeywell 66/10 and 66/20 and Burroughs B6738 and B6748 with similar memory size, Univac claimed.

Larger 1100/10 processors also show price/performance advantages over their competition, Univac said.

The 1100/10 supports the full range of 1100 series software and hardware, thus bringing "large-scale multiprocessing and multiprogramming to the medium-scale price segment of the market," the company said.

This latest 1100 series model is intended to offer users a growth path to larger 1100 machines without forcing the user to replace much previously installed equipment, it added. The 1100/10 systems can be field-upgraded to faster 1100/20 systems.

The 1100/10 is both faster and less expensive than the Univac 1106, previously the lowest priced 1100 series CPU. The 1100/10 compares in size to Univac's byte-oriented, noncompatible 90/60 and 90/70 line, a spokesman said.

The 1100/10 can address up to 512K of semiconductor main memory. Three 128K modules can be added to the original 128K module, or the memory can start with a 256K module and be increased with a second module of the same size. Cycle time is 1.125 µsec.

The 1100/10 is not a particularly fast machine as today's technology goes, but the 4K chip MOS memory helps keep the price down, the spokesman said.

The 1100/10 offers 128 general registers, from four to 16 I/O channels and I/O channel parity.

Four high-performance disk drives are available for the 1100/10 system the Univac 8405, a fixed-head disk in two versions for high-speed, real-time applica-

(Continued on Page 3)

IBM Hikes Equipment Prices 4%, Says Maintenance Will Rise 9%

By E. Drake Lundell Jr.
Of the CW Staff

ARMONK, N.Y. – Prices are going up for most computer equipment from IBM.

Rental and purchase prices will increase approximately 4% and maintenance charges will rise about 9%, the firm said last week.

The price increases, which IBM said "reflect the partial recovery of the generally increasing cost of doing business," apply to most of the products offered by both the firm's Data Processing Division (DPD) and the General Systems Division (GSD).

All of DSD's products will rise in price, the firm said, except for several recently announced or recently shipped products.

The products unaffected by the 4% increase in purchase and rental prices include the 3344 disk drive, the 3350 disk drive, the 3600 financial communications system, the 3650 retail system, the 3660 supermarket system, the 3760 dual key-entry station, the 3767 communications terminal, the 3770 data communications system, the 3790 communications system and the 3800 printing subsystem.

The prices of all other DSD products will rise, with the purchase price increase in effect immediately and the rental increase effective Jan. 1.

At GSD, the purchase and rental rates for the System/3 Model 12 will not be raised.

(Continued on Page 5)

Aetna Joins Satellite Venture

WASHINGTON, D.C. – A large data communications user will join IBM and Comsat General to establish a domestic satellite system.

Aetna Life and Casualty will become the third partner in the CML Satellite Corp. under a plan announced by the three firms last week. The plan meets the requirements for ownership of the company mandated by the Federal Communications Commission in February [CW, Feb. 5].

Under the arrangement, IBM and Comsat General will each initially own 42.5% of the stock in the new firm and Aetna will have a 15% interest. Aetna, however, will have the option of increasing its ownership to 33.3% in the period before the satellite system becomes operational.

All three would make an investment of up to $55 million each in the system for a total investment of $165 million.

The three partners did not outline operational plans for the proposed system last week, but promised to release more details in a filing with the commission within 60 days.

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In Antitrust Trial Testimony

HIS Concedes IBM Can Force Market Exit

By Edith Holmes
Of the CW Staff

NEW YORK – The question went something like this: Can IBM take any actions which might lead to Honeywell's exit from the mainframe business?

But to Clarence W. Spangle, president of Honeywell Information Systems (HIS) and executive vice-president of Honeywell, Inc., during his testimony as a government witness last week in the trial of the Justice Department's antitrust suit against IBM [CW, Oct. 1], this query hit at the central point the government is trying to prove.

Specifically, it may have forced several major contenders to abandon the business, the Department of Justice contends.

Do the other mainframers feel and react to such a threat? And, if competition is so limited, won't users ultimately be the ones hurt? These are among the questions that must be answered – and answered in the affirmative if the government is to win its case.

Spangle naturally hesitated in giving an answer. "Well, theoretically, there are actions which it could take that would have that result.

"I have no information or idea it is motivated to do that," he said, adding, "I don't want to indicate to the public at large it's so easy to put Honeywell out of the computer business."

No Choice

The Honeywell executive felt he had no choice but to answer the question in that manner; he has a company with customers and stockholders to protect.

But his answer pointed out a problem the Justice Department is likely to run up against again and again in its bid to have the mainframe makers, in particular, say publicly what they have often expressed privately.

From the viewpoint of Grant Moy, the government attorney questioning Spangle on direct examination, there was no choice but to pursue his initial question with: Whether IBM is motivated to take actions that would force Honeywell out of the business, would the corporation be able to do that – what are those theoretical possibilities?"

Placed in such an uncomfortable situation, Spangle did not answer immediately, prompting the court to deliver a brief lecture on the obligation of a witness in accordance with his oath "to tell the truth if you have an answer you can give.

"The impact of that answer on Honeywell or anyone else is of no consequence," Judge David N. Edelstein added.

At that moment, counsel for Spangle as a representative of Honeywell stood up and asked to be heard by the court. The judge denied an open court statement by the attorney, but agreed to hear him in private.

Analysis

'Robing Room Conferences'

Unlike most of the "robing room conferences" held in this trial so far, this one was not and will not be transcribed. Asked why not, Edelstein responded that, as a third party not directly involved in the suit, Honeywell had no right to expect its counsel to have a say in court.

"I listened to Honeywell's counsel out of courtesy," he said.

Well-Rehearsed Reply

Having come at the end of the day, the question posed by Moy had to wait until the next day to be answered. Asked again what the theoretical possibilities were that IBM could force Honeywell from the general-purpose computer systems business, Spangle gave a well-rehearsed reply.

"Given the fact that, at the end of 1974, IBM had more than $3.5 billion dollars in cash and cash equivalents; given the fact that its rates of profit before interest and tax have been about 25% or in some cases in excess of that, whereas those of Honeywell have been, on the average, over the past few years at around the 10% level and those of HIS at a still lower level; given the fact that IBM has a much larger number of installations than has Honeywell – it is theoretically possible that IBM could effect a drastic price reduction in general-purpose computer systems," Spangle said.

In addition, the corporation could, during periods of high inflation, fail to raise prices in line with increases in cost, he noted.

"If that were to happen and were to be continued over any extensive period, HIS would have to probably react and reduce its prices to the point where it could become unprofitable," Spangle added.

"I have no information or belief that IBM intends to do this sort of thing or that it would do it," Spangle quickly cautioned. "Frankly, I don't think it would be in the best interests of its shareholders to undertake such a program."

IBM Document Ruled Not Enough To Reopen Telex Case Discovery

TULSA, Okla. – Even with the addition of new evidence [CW, Oct. 1], there is no need at this time to reopen discovery in the Telex vs. IBM antitrust case, according to a Federal District Court judge here.

Judge A. Sherman Christensen, who handed down the original decision in favor of Telex in the case, said last week "no showing yet has been made to warrant this court's reopening its discovery on the theory that the documents in question were wrongfully withheld in this proceeding."

However, his ruling would not preclude the use of such documents at the appropriate time, he said, indicating that time would come after the Supreme Court has ruled on Telex's request for a review of the case.

In reaction, IBM said "we think the importance of the document is put into perspective by the decision . . . to deny all motions made by Telex based on it."

The document in question showed IBM management felt constructing interfaces for its peripherals to work with other systems would be time-consuming and expensive.

IBM lawyers in the Telex case argued such interfaces were relatively minor undertakings.

On the Inside This Week

Grand Jury Indicts IBM for Conspiracy to Foil Bidding

(Continued from Page 1)

The city then decided a larger model would be more suitable and changed the order to a 370/125, according to the indictment.

Other Vendors Rebuffed

During the time city officials were "meeting with IBM" on the procurement effort, representatives from both Honeywell Information Systems and Burroughs Corp. who contacted them about possible equipment changes were told the city "was not planning any immediate changes," according to the indictment.

About March 11, 1974, before the RFP was issued, Walter Happell, then DP director for the city, began working with IBM to convert the city's computer programs, written in NCR Neat/3, to an IBM-compatible language.

Later that month, Thomas O'Connell, manager for IBM's New Jersey branch, internally confirmed by written memorandum Jersey City's order for a 370/125.

Between mid-March and mid-April, city officials employed DP consultant Robert Rapp as a broker to arrange for computer time so cards could be keypunched as part of the conversion project.

An NCR disk pack containing computer programs in NCR Cobol was delivered in April to Better Brands, also known as Data Associates, in Long Island City, N.Y., where cards were punched from the disk pack as a preliminary step in converting the Jersey City Board of Education NCR Cobol programs to IBM Cobol.

On April 3, 1974, the city issued bid specifications for the new system which incorporated, almost verbatim, the language from prior sets of specifications given to the city by IBM.

A second part of the specifications, physically prepared by IBM personnel, was written in language which, the indictment said, described "almost exactly the characteristics and capabilities of an IBM Series 370 computer and related software packages despite the fact that the detail employed was not even directly related to the activity for which the purchase, contract or agreement was to be made."

The following month, an "evaluation committee" consisting of some of the same city officials who participated in writing the contract issued a report recommending the contract be awarded to IBM, according to the indictment.

Peter Korn, Walter Happell and Joseph Cahill, the city's former finance director, were charged separately for conspiracy and for violating their duties as public officials.

IBM's Eugene Josephs and Roger Forsyth, an executive of First Jersey National Bank, were charged with conspiracy.

Thomas O'Connell of IBM was listed as an unindicted coconspirator.

IBM Saw It This Way

After looking into the matter, IBM explained that, in June of 1973, IBM sales representatives began "a vigorous sales effort" to convince city officials of the benefits of centralizing and to sell the city an IBM computer system to do the work.

As a result, a 370/125 was installed which is handling the work efficiently. There are "no problems of misrepresentation, poor performance or excessive costs," IBM said.

IBM salesmen were confident they would make the sale long before the city's award, IBM said, and the early equipment order was made for that reason.

As for IBM's involvement in drafting the city's RFP, the company explained city officials had "a lack of expertise" about what was needed for an efficient, centralized DP system.

As a result, city officials leaned heavily on IBM for advice and recommendations, IBM said.

Univac Adds 1100/10 To Mid-Sized Market

(Continued from Page 1)

tions; the 8430 and 8433 removable disk systems for controlling large data bases; and the 8425 removable disk drive.

Univac also announced the Univerno 14 magnetic tape subsystem for the 1100 family of computers.

A low-cost subsystem, the Univerno 14 offers 9-track phase-encoded and 7- and 9-track NRZI recording at 96K byte/sec.

The tape subsystem provides automatic loading and threading capability using standard or cartridge tape reels.

The 1100/10 system provides for reliability by employing built-in error correction techniques, by maximizing the modularity of system components and by means of autorecovery capabilities, Univac said.

In addition, interchangeable data paths to the central processor are provided through dynamic reconfiguration, the company noted.

Maintenance Options

Maintenance for the 1100/10 is facilitated in several ways. One is for the user to utilize a set of routines for on-line maintenance to check out suspected components and diagnose their condition without disrupting operations.

Another technique is to use Univac's Total Remote Assistance Center (Trace) system.

With Trace, the user can connect his 1100/10 directly to the Univac Trace center in Roseville, Minn. for diagnosis and repair.

Monthly rental (including maintenance) for the Univac 1100/10 on a one-year contract begins at about $20,000 and ranges upward to about $55,000.

The comparable purchase price ranges from approximately $800,000 to $2 million. Deliveries will begin in April.

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GAO Probing SSI as Overpayments Top $403 Million

(Continued from Page 1)

A backlog of hearings keeps many overpayments that frustrated SSA officials know how to correct going out month after month, with no assurance recipients will return more than about 38% of the funds.

Fourth, late reporting of changes in eligibility keeps individuals' files in an eternal state of flux and causes retroactive changes.

Finally, occasional logic errors from time to time have generated rather dramatic one-time-only overpayments [CW, Sept. 3].

The Senate Appropriations Committee's Subcommittee on Labor and Health, Education and Welfare Department Appropriations is considering legislation to amend certain Social Security benefits programs.

But before it acts, it wants solutions to some of the systems problems that have bogged down SSA DP operations since the SSI program began a year ago January, a staff member said.

Effect on Other Programs

Bayh also has expressed concern about the effect SSI's seemingly error-prone recordkeeping has had on other federal grant programs.

Medicare, Medicaid and food stamp programs depend in some part on SSI records, a Bayh staff member said.

State magnetic data exchange tapes are furnished by SSI's DP department to 26 states and the District of Columbia for use in maintenance of each state's SSI program as well as the administration of Medicaid programs.

Exchange of erroneous eligibility information can spread errors throughout the entire nation's welfare programs on both the state and federal levels, according to Bayh.

Sought in the GAO probe are answers to questions such as:

- Just what is the current overpayment figure.

Estimates based on a routine quarterly review of case records as of June 30 ranged from a low of $403 million to a high of $424.6 million for the 18-month period.

- How much of the overpayment total can SSA expect to recover?

The SSA told Bayh experience has shown 14% of recipients will return overpayments in lump sums and 24% will pay in installments, for a total of 38%.

About $28.4 million has already been collected and corrected, SSA said, but $39.4 million has been written off as uncollectable.

The GAO is expected to look into the estimated $35 million in underpayments.

The GAO will also attempt to determine how errors in SSI records affect other programs administered by the SSA. Although SSA officials deny there is any effect, Bayh said constituents tell him otherwise.

One woman who received overpayments of $146 a month started putting this in the bank at the suggestion of her local SSA case worker. After 10 months her bank account had built up to $1,400.

"The next thing she knew she received a notice saying she was being cut off from Medicaid because she had too much money in the bank," Bayh said.

The GAO is also looking for ways to save money by streamlining systems. Although the SSA has been working on a system linking SSI to SSA records to provide for fully automated eligibility verification before SSI benefits are paid, this system has not gotten off the ground because the computers in use are "incompatible," SSA officials said.

IBM Raising Prices Of Products, Upkeep

(Continued from Page 1)

The purchase prices of the System/3 models 6 and 10, the System/7, the 1130, the 1800, the 360/20 and the 5100 portable computer will also be unaffected by the raised rates.

Furthermore, GSD said it has not raised the rates on several products which received reduced rates in July, including the 370/115 and 125 CPUs, optical character reading equipment and some tape and disk products as well as certain terminals and printers.

Maintenance Rates Hiked

In the area of maintenance, all hourly field engineer and customer engineer rates are going up by the approximately 9% figure.

For example, for Class 3 hourly service during working hours, the new rate will be $44.25 compared with the $40.75 previously in effect.

Outside normal hours, the fee for the same class of service will be $57.75, up from $53.

On monthly maintenance contracts, the price will rise on approximately 300 types of equipment; it will stay the same for 173 types of equipment but go down on 27 equipment categories.

The no-change policy is in effect for such devices as the 3650 retail system, the 3660 supermarket system, the 165 CPU, the System/3 CPU and the System/32.

Some Reductions

Price reductions for monthly maintenance will be made on such equipment as the 370/195 CPU, the 3360 memory for the 155 and 165 CPUs, the 2365 memory for the 360/65 and the 3046 power unit for the 145.

Increases will affect all other 370 CPUs, all 360 CPUs, the System/7, 1130 and 1800 CPUs as well as all other equipment not exempted from the raised rates.

The hourly maintenance rate increases go into effect immediately while the new monthly rates begin Jan. 1.

IBM estimated the average effect on a customer installation will be a 3% rise in the cost of doing business next year.

Sicob Brings Technology — And Politics — to Paris

By E. Drake Lundell Jr.
Of the CW Staff

PARIS — Political controversy more than technical innovation marked the 26th edition of the Salon International de l'Informatique du Bureau (Sicob) here this year.

Both the sessions of Convention Informatique, held in conjunction with Sicob, and the huge exhibit itself were disrupted at one time or another by demonstrators protesting the French government's plans in the computer industry.

But even with the disturbances, Sicob managed to live up to its reputation as one of the largest displays — if not the largest — of computers and related office equipment in the world.

This year's version, which ran from Sept. 18 to Sept. 26, was fully expected to break last year's pace. At that conference, 1,673 exhibiting companies represented 25 countries and drew 267,237 visitors from 99 countries. The final statistics for this year's attendance will not be available for some time.

But while all of the big mainframe makers were there, along with most of the mini makers and peripheral vendors that operate in France, the real interest at the show centered on two issues that are splitting the French computer community.

The first dealt with a government plan here to establish a national numbering system for individuals under the code name "Project Safari;" the second dealt with the future of the industry itself and government funding in the industry.

Under Project Safari, all Frenchmen would be assigned a number, and a data bank with this information would be established — a move that has been opposed by several groups since it was originally proposed in March of last year.

But while Project Safari caused consternation among civil libertarians and their sympathizers here, the real issue that brought demonstrators to the streets and into the keynote session involved the future of the French computer industry itself.

Plan Calcul

For years, under Plan Calcul, the French government has poured millions of dollars into Compagnie International pour l'Informatique (CII), the French national entry into the computer business.

But now that the government has taken over an interest in Honeywell Bull, which is still 45% owned by Honeywell, there is a great deal of confusion here over the future of CII.

The French government will own 53% of Compagnie des Machines Bull when that firm is formed by the merger of Honeywell Bull and CII at the end of October [CW, May 21]. However, the government has not announced any working details of the proposed merger.

At the same time, the government has outlined plans to lay off 1,000 workers out of 5,000 at one of the CII facilities, which has led many within that company to assume the future will be based more on Honeywell Bull than on CII, leading to large-scale displacements of CII workers.

Besides that purely economic issue, there is also the problem of national pride in the picture, with many Frenchmen viewing Honeywell Bull as "too American" to truly be the French entry into the world marketplace, since Honeywell still controls such a large portion of the stock.

The problem, therefore, seems to be a two-phased one: first, there is a lack of solid information about what will happen, if anything, to the government support plans and, secondly, the entire subject brings the issue of national pride to the forefront of the debate.

And at Sicob those worries and fears on the part of French workers were translated into action at both the exhibits and the sessions.

Keynoter Quizzed

The keynote speech at Convention Informatique, delivered by Hugues de L'Estoile, the French ministerial representative for industry, was enlivened considerably by questioning from the floor on the CII issue, even though he managed to avoid answering the questions in a meaningful manner.

And, later that week, over 100 demonstrators showed up to protest the unknown future at the opening of Sicob itself, providing an interesting contrast to the rather staid exhibit inside, where most firms displayed only old products.

The CII protesters, many of whom said Plan Calcul has now been turned into "Plan Honeywell," sought assurances from the government about the future of their jobs — particularly in light of the layoffs and a planned salary increase this month.

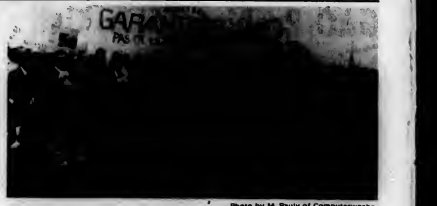


Photo by M. Pauly of Computerwoche

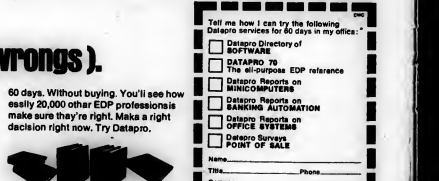
Demonstrators concerned about the future of the French computer industry — especially as it relates to CII — massed outside the Sicob exhibit hall . . .

CW Photo by E.D. Lundell Jr.

. . . While business as usual continued inside.

In addition, the more radical of them urged the government to completely nationalize both CII and Honeywell Bull into one 100% government-owned business in order to make a strong entry into the market without a large American investment.

But while the protest added some life to the opening of the show, it was soon over and the issue was still unresolved.



CW Photo by E.D. Lundell Jr.

At Sicob vendors used even the tops of their booths to advertise.

As French as Crepes

PARIS — Although billed as an "international" exhibition, the Sicob show here late last month was as French as crepes and cancan girls.

While visitors came from all over the world to view the exhibit, they were often stymied because booth personnel generally spoke only French — only a smattering of English or German was heard among the exhibitors.

And the international marketing men that flock to most shows on the continent, such as the Hanover Fair and Systems 75, were notable more by their absence than their presence at Sicob.

Even the facilities for the press were limited almost exclusively to the French-speaking press, with little help available for the journalists that came to the show from around the world.

So while it called itself an "international" exhibit, Sicob was really a French show for the French — and a quarter million of them turned out during the two-week run.

Cost, Decentralization Benefits Outweigh Disadvantages of Mini

By E. Drake Lundell Jr.
Of the CW Staff

PARIS – The advantages of minicomputers far outweigh the disadvantages, and the disadvantages are becoming fewer every day, according to J. Donio, DP deputy manager at the National Employment Board here.

The most obvious advantage of the minicomputer system is the cost of the hardware, but the software for a mini-system or network of minicomputers can be as expensive as it would be for one large system, Donio noted at a recent session of Convention Informatique held here in conjunction with the Salon International de l'Informatique de Bureau (Sicob).

However, cost is not the only factor that makes minicomputers attractive to the system designer, he said.

First, the minicomputer allows the designer to decentralize the operations of a firm, which puts the processing closer to the point of a transaction and subsequent data collection.

It is always more expensive to transmit data in its crude state, since it is then likely subsequent transmissions will be required to correct errors.

But, besides the cost factor, there is also a psychological benefit derived from putting the processing close to the origin of the data. This is because the people who know the data best get involved in the processing and not just the collecting of that data.

Often, these will be the same people who will have to use the data also, and they know what reports and other outputs they need from the system, he indicated.

If the system is under their control locally, it is much easier for them to make it adapt to their real needs.

Overcomes Obsolescence Problem

Furthermore, minicomputers can also help overcome the problem of obsolescence in systems, he indicated.

In a multiunit system of minicomputers, individual CPUs in the configuration could be replaced on a rotating basis with the latest technology introduced at each replacement time.

In this way, the network can be constantly upgraded at a relatively low cost each time, instead of having to make a major system change all at once, as would have to be done with a system based around a large central CPU.

Another advantage of the minicomputer is the ease of installation for such systems and low investment required for non-computer auxilliary equipment that is needed in computer rooms for large systems.

The systems don't need expensive air conditioning or other special equipment and are easier to maintain than the larger systems, Donio indicated.

The major drawback to the use of the minicomputer is the relative lack of power in the individual components, but this can be overcome by networking the systems, he indicated.

Another problem with the use of minicomputers today is that the range of software available for the units is limited, he indicated.

But, as more standards are developed in the area, this problem should be overcome as software developers realized the opportunities.

In addition, the system manufacturers will probably develop more software for their systems in the future, either as complete software packages or as software tools that make it easier for the end user to program the system himself.

CW At Sicob

System Safeguards Swiss Documents

PARIS – Switzerland is well known for its belief in secrecy, and that belief has lead the Department of Defense there to install a minicomputer system.

The system has allowed the department to dedicate an entire system to one application and still keep the costs down, according to M. Sulzer of the department, who spoke at a session of Convention Informatique held here recently in conjunction with the Salon International de l'Informatique de Bureau (Sicob).

The CPU and CRT are in a secret location, he said.

The Department of Defense wanted to develop a data base of all contracts it has outstanding and information on the firms with which it conducts business, he said.

This information was, of course, extremely confidential and the government had a responsibility to keep it secret.

Overall, the system needed to handle the equivalent of 50,000 documents, Sulzer said.

The organization installed a Digital Equipment Corp. PDP-11/40 with 64K of main memory, 40M bytes of disk, five CRTs, and a 300 char./min line printer and a computer-output microfilm (COM) system to meet the need.

All of the documents are microfilmed and indexed, with the index placed on the computer system. The index is a complete key-word index and has abstracts of all the documents, Sulzer said.

The user can access the system by key word, read the abstract and then, if he wants to see the entire document, he can look it up on a microfilm reader that is attached to the CRT workstation.

Mini-Based Switching Eases Behind-the-Scenes Hassles

By Nancy French
Of the CW Staff

PHILADELPHIA – Anyone who has ever struggled with a home movie projector has probably wondered why things always look so smooth on TV.

The answer is that it's no accident; it takes a lot of often harried people to give television its polished look.

Recently though, more and more stations have turned to computers to produce the cleanest possible output and, especially, to assure all commercials air as ordered by their clients.

When mistakes are made airing a commercial, a station has to give that client a "make good" by running the commercial over again free of charge – which makes errors costly.

At most TV stations, the product transmitted to your home is carefully controlled by teams of technicians working with one eye on the clock and the other on a detailed schedule, which accounts for every second of the broadcast day.

Videotape operators and film projectionists are constantly loading, monitoring and unloading videotape cartridge machines, reel-to-reel videotape machines and film and slide projectors to air events that are often scheduled only a few seconds apart.

"With some commercial spots as short as 10 seconds and most only 30 or 40 seconds, a two-minute station break can get pretty hairy," one technician pointed out.

The individual who coordinates the activities of these technicians is the Master Control Technical Director (MCTD), who works at a large switching console with a button that controls every video source and audio source in the station.

He switches from event to event, sequencing the various commercials, public service announcements (PSA) and programs that are transmitted to viewers' homes on time.

Computerized Switching

At Station KYW here, one of five stations owned and operated by Group W (Westinghouse Broadcasting Co.), the MCTD has help from a new, minicomputer-based switching system.

KYW technicians now simply load commercials and program material on the appropriate videotape cartridge machines, reel-to-reel videotape machines or film or slide projectors. When the material is loaded, the technician keys in a unique six-digit house number using a keyboard on that machine; the number tells the system which machine has been assigned to each task listed on the schedule.

The system prerolls film and tape and then switches to the output of the machine assigned to each scheduled event in sequence by the real-time clock or based on the elapsed time of the previous event, with no human intervention, according to Charles Magee, Group W's engineering director.

The MCTD is still the focal point of the broadcast operation, but he is relieved of the chores of switching those events manually from his console.

Watches the 'Stack'

At KYW, the MCTD monitors the operation of the computer by watching the "stack," or list of scheduled switching events, that appears on a TV monitor mounted on his console.

"The mini keeps computing elapse times to assure no time problems will occur later in the stack," Magee explained. "If an item begins to flash, the MCTD knows he's got a problem in plenty of time to decide how to solve it."

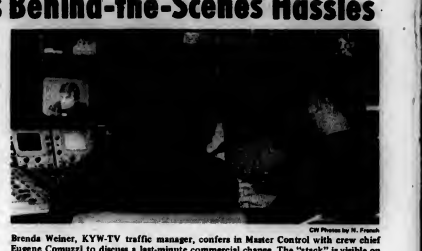
In general, the MCTD need only take manual control of the switching operation if a problem arises, he added.

But the whole process actually starts long before even one slide is loaded on a projector – it begins with preparation of the schedule.

First the program schedule is planned, which accounts for about 48 minutes per hour. The remaining time, which is used for commercial breaks, is divided so several minutes fall on the hour, the half hour and in several intervals in between.

At this point the traffic department

Traffic clerk Jackie Kirkland prepares the day's log by literally filling in the blanks.



CW Photos by N. French

Brenda Weiner, KYW-TV traffic manager, confers in Master Control with crew chief Eugene Cesmazi to discuss a last-minute commercial change. The "stack" is visible on the TV monitor between them.

steps in to schedule the commercials sold by the sales department in the time periods requested by their clients. The traffic department also fills all unsold time during these breaks with PSAs or promotional announcements about upcoming station programs.

Scheduling Speeded

At KYW, a 16K Digital Equipment Corp. PDP-11/15 minicomputer-based turnkey broadcasting system, developed by Central Dynamics Ltd. of Montreal, has vastly simplified and speeded up the entire scheduling process as well as its switching.

The mini supports two double-density disks, two printers, three CRTs and 14 separate numerical keyboards attached to 14 various film and tape machines.

Each piece of air material – be it commercial, PSA or station promotion – is assigned a six-digit house number. This number, which is linked to production information, organization name and time duration, for example, is stored on Iomec 3004 double-density disks.

Each day, when traffic clerks construct the schedule, they need only fill in the blanks of a skeleton version of the schedule prepared for the same day the week before, Magee explained.

Clerks key in the file number of the film or tape called for on a roughed-out schedule and the system calls up the remainder of the information needed to complete the item.

After all the new "spots" are input and verified, a Memorex 1250 printer generates the entire schedule in a matter of minutes on a continuous-feed multilith master which is sent to the station print shop for duplication.

On the day of broadcast, the few changes that must still be made are brought to Master Control by a traffic clerk and the MCTD edits the schedule via his CRT. He also assures corrections are made on the copies in the hands of key technicians, Magee explained.

Without a computerized system, getting the schedule typed, proofread and then duplicated and distributed required several days' lead time, during which additional spots were usually sold or the client changed his mind about the product he wanted to advertise, for example. Commercials and PSAs often had to be dropped or changed.

Much hand correcting went on, and usually one frazzled traffic clerk had to go all around the station changing every technician's copy of the schedule, Magee explained.

As the MCTD monitors the computer as well as KYW's output, he edits the schedule if it varies at all from the originally printed version. This becomes part of the station's official log of the broadcast day, in accordance with requirements set by the Federal Communications Commission.

Several copies of this official log are printed out by another Memorex 1250 in Master Control. One copy is kept on permanent file and another goes to the accounting department for use in billing receivables, Magee explained.

Neither accounting nor sales has been brought onto the system yet but "we're looking at ways to do that," he said.

Backup for the system is provided by a second PDP-11/15 in John Watson's office. Watson, who is Group W's director of technical automation, uses the second system for writing programs.

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- ☐ INFORMED
- ☐ SURPRISED

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21 Director/Manager of Operation/Planning/ Administrative Service
22 Director/Manager/Supervisor DP
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31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
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70 Lawyer/Accountant
80 Librarian/Educator/Student
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Viewers who see these frames as part of an animated commercial promoting a local radio station might never guess they were keypunched on 80-column cards.

Simulated Animation Process Does Disney One Better

By Nancy French
Of the CW Staff

ELMSFORD, N.Y. -- Ever wonder how letters and numbers can be made to dance around or literally rotate through space in the TV commercials and station identifications you've been seeing lately?

Some of this animation is done with Synthavision, a computer simulation process developed by Mathematical Applications Group Inc. (Magi) here.

Computers At Work In Broadcasting

The drawings that make up these three-dimensional animated sequences are programmed by computer rather than being drawn and colored by hand in the conventional way, Dr. Philip Mittleman, Magi president, explained.

Disney's Style

By comparison with Magi's Synthavision, conventional animation, pioneered most successfully by Walt Disney, is a very repetitive, painstaking art form. For every separate movement in a film, an artist must draw and color a separate drawing on a transparent sheet called a "cell."

In his studios in California, Disney employed hundreds of artists to produce the millions of cells needed to make a single feature film such as *Cinderella*.

These cells are placed in correct sequence and photographed frame by frame using an animation camera. After mixing with sound, the film is run on a projector at the standard motion picture speed of 24 frame/sec. This is fast enough to fool the eye into seeing actual movement.

Simple multiplication shows 60 seconds of animation could take as many as 1,440 cells.

"In his best days, Walt Disney couldn't do what we're doing now because it's just too complex to do by hand," Mittleman said, "If an animator tried to figure out what the shading and the perspective should be in some of these complex cartoons, he would go out of his mind."

The entire Synthavision process is done by computer, he said.

How it Works

"If you remember when the astronauts went to the moon, they carried a little television camera with them. When they would point it at a rock, for example, the camera merely measured the brightness at each point on a sensitive area, converted those measurements to a radio signal and sent them to earth where the pictures were put up on a CRT," Mittleman explained.

Our process is something like that, without using a camera," he said.

Bo Gehring, Synthavision creative vice-president and principal designer, starts the computerized process working from a series of sketches, or a storyboard, provided by the client. The storyboard describes the desired objects, their color, movement, camera angle and light source.

This information is keypunched on standard 80-column cards and fed into the company's 512K IBM 360/65 computer. The operating language is Fortran.

Then, using proprietary software developed by the firm, the system calculates the brightness and color at each dot and records the data line by line on magnetic tape, Mittleman said.

A 20K Data General Corp. Super Nova is then used to read the tape and generate each individual picture on a high-resolution, 1,000-line CRT, custom-designed by Information Displays, Inc. of Mt. Kisco, N.Y.

Using a standard animation camera, the pictures are photographed frame by frame right from the CRT, Gehring explained.

Color is added by photographing the CRT through a color wheel in a light-tight box. The camera shutter is held open for three CRT passes and a different primary color is mixed each time, he explained.

'Something Different'

The process is costly -- ranging from $5,000- to $15,000 per minute, Mittleman said, but clients looking for "something different" find it's worth the price, according to Natalie Scofield of Carr-Liggett Advertising, Inc. in Cleveland.

"Since we were advertising an electronic medium, and our client was the top radio station in the city, we didn't want something that looked low-budget," she explained. "Mixed with computer-sounding music, the spots were very effective," she said.

While not nearly as time-consuming as standard animation, Synthavision spots can't be turned out in real-time either, according to Gehring, "because of the quality we're producing.

"It takes as much as eight hours to lay down the animation on film for a 60-second spot," Gehring said.

The same techniques used to film a 60-second commercial can be used in a feature-length cartoon or an educational film, Mittleman explained.

The only thing we can't really do yet is model people's faces," Mittleman said, "but we're working on it."

DP as Disc Jockey

System Helps Produce Radio Programs

By Nancy French
Of the CW Staff

BOSTON – When WEEI-FM radio station listeners hear a favorite song, followed by an announcer giving its title and artist, that sound isn't coming from a disc jockey (DJ) spinning records in a studio.

Computers At Work In Broadcasting

The song as well as the announcement are just two "events" in the station's broadcast day that are prerecorded on cartridges sequenced and switched automatically by the station's on-line minicomputer.

And between these events, the system switches to brief segments of DJ chitchat, prerecorded on a voice track.

While listeners are enjoying a number by the Carpenters, for example, announcers and technicians are working together to record an upcoming news program, weather report or even the next day's voice track, Jon Arbenz, the station's general manager, explained.

"It's more efficient to prerecord these events," Arbenz explained. "It also produces a cleaner, nearly perfect air product."

How It Works

When Program Manager Peter Miller sits down to program a day's music selections, he can call for a list of all music recorded on cartridges by specific type such as ballads or female vocalists, for example.

Miller enters his selections by cartridge number, and the system completes the log, including such things as event number, file number, title and artist for each cut and duration, for example.

After the log is completed, technicians, working from a log printout, rack the cartridges in their proper slots in International Good Music, Inc.'s (IGM) Instacart playback machines according to the number on each cartridge label.

The slots are hard-wired to the mini so when the program log calls for a certain piece of music by event and slot number, the mini instantly cues it to begin to play when the preceding event is completed.

"Of course if the wrong cartridge is in that slot, the wrong piece of music will play," Robert Cook, engineering supervisor, said.

The program can be changed at any time up to a minute or two before the event is scheduled for air," Cook explained.

Although the computer is the heart of WEEI-FM's operation, it really doesn't do anything but sequence the "events" called for on the daily program log, Arbenz pointed out. "It takes the talent of a lot of individuals to make a radio station successful," he said.

The system, known as a human error reduction machine (Big Herm), consists of a DEC PDP-8E, two Diablo Systems, Inc. disk drives, a Centronix printer, two Data Computer Corp. CRT terminals and six Instacart playback machines. An Instacart has 48 slots, each with its own playing head, Cook explained.

In all, between the network line, microphones in the station's two studios, reel-to-reel tape recorders, record turntables, Instacarts and the like, the minicomputer can accept input from some 60 audio sources.

However, most of the material for the station's daily music program – "an adult, contemporary sound" – is recorded on cartridges resembling the 3M Co. cartridges used in automobile tape decks or for digital data collection.

Without the minicomputer, FM broadcasting would not really be what it is today, Arbenz said.

Historically, most broadcasters used their FM transmitters to simulcast whatever was airing on their AM stations. There were no FM station employees, and few commercial spots were sold.

Then, in August 1964, the Federal Communications Commission (FCC) ruled stations would only be permitted to simulcast AM programming during half their broadcast day. The balance of the broadcast material would have to be generated by the FM station itself, Arbenz explained.

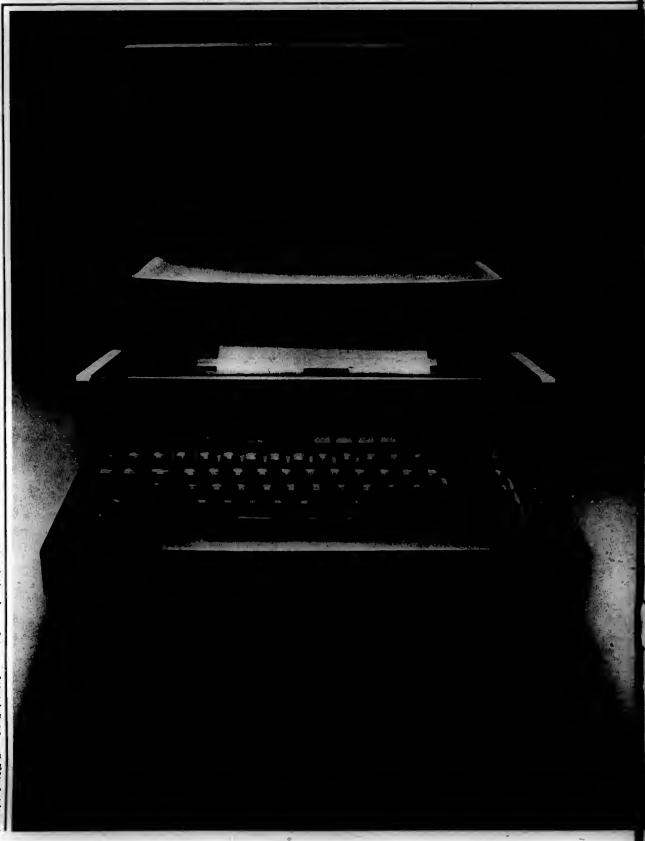
CBS, WEEI's owner, met this requirement by recording half a week's worth of music tapes and sending duplicates to each of its seven FM stations. These tapes were rotated and played during different time slots over the course of the broadcast week.

Then, in the late '60s, CBS decided to expand FM. New transmitters were installed, additional staff was hired, and CBS management began to explore the possibilities of automation. WEEI was the test site.

As for maintenance, DEC maintains the computer itself, Cook has learned how to maintain all the peripheral gear himself, he said. If a problem turns out to be something he can't fix, the station gets good service from the vendors, he said.

WEEI-FM operates 24 hours a day, seven days a week with 17 employees. Across the hall, WEEI-AM employes 110 people to keep its 24-hour, all-news operation going.

"There's always a technican on duty on the AM side who can step in if a problem comes up during the 72 hours a week Big Herm is on alone," Cook said.



TV Station Uses T/S Service to Handle Commercials

Computers At Work In Broadcasting

By Nancy French
Of the CW Staff

MINNEAPOLIS – WTCN-TV, a large independent UHF station here, is one of about 40 television stations that uses a broadcast computer service to help write contracts for commercial spots, schedule commercial rotation on the air and bill their clients.

The service, provided by a division of Kaman Sciences Corp., includes time-sharing and data base management on two Control Data Corp. Cyber 72s, a Model 13 and a Model 14, in Colorado Springs as well as a turnkey system at the station.

The station's system utilizes a 28K Digital Equipment Corp. PDP-11/05 for local data entry, storage and communications functions.

Selling Time

Television time is sold in two primary ways – in a package and by long-term contracts.

If a client wants a spot next to 'All in the Family,' for example, he's got to be willing to take a couple of other spots adjacent to some lower rated shows as part of the deal.

As for commercials sold as part of a long-term contract, such as those that run for 13 or 26 weeks, these are rotated so some spots air during both peak viewing hours and periods when not as many people are watching, according to Pat Anderson, WTCN traffic manager.

Some are sold with the understanding they can be pre-empted if a higher priced, one-time-only spot is sold.

Store and Forward

To set up a commercial contract file in the Cyber's data base, for example, a traffic clerk working at a Hazeltine 2000 terminal at the station keys in all the information needed to confirm the contract.

This includes such data as client's name, the advertising agency code number, type of air schedule, duration of the commercial, contract duration and rate, for example.

The information is stored on the station's DEC RK-11 disk system until connect time, Anderson said, and "that's the only time this information has to be entered into the system unless the contract changes."

Then, once a day, the PDP-11/05 transmits the stored data to Colorado Springs, Anderson said.

The system plans a commercial rotation schedule according to parameters requested by the client and stores that information in the data base.

"Every morning our CDC 9342-1 printer has a printout of everything we keyed in the day before, as well as a printed confirmation contract for each new client and a nearly completed version of the next day's schedule.

"This schedule includes most of the commercials as well as the programs and public service announcements right from the data base," Anderson said.

The schedule is stored on the PDP-11/05 until last-minute commercial changes, public service announcements and promotions are added, she explained.

Once the schedule is completed it is printed, distributed and transmitted to a second minicomputer at the station – a PDP-11/15 – which is dedicated to the physical work of cueing projectors, rolling video-tapes and switching machines on and off in accordance with the air schedule, explained Ken Swanson, WTCN assistant production manager.

Developed by Central Dynamics Ltd. in Montreal, the system is linked by cable to the traffic mini, Swanson explained.

The PDP-11/15 keeps the entire day's schedule of events on-line and displayed on CRT terminals mounted on the Master Control Technical Director's (MCTD) console as well as others mounted elsewhere in the engineering department. It also controls switching much like the system in use at KYW in Philadelphia (see related story on page 8).

If technicians depart from the schedule and a station identification is omitted or a commercial "gets blown" – is not aired or is chopped off by mistake, for example – the MCTD inputs these errors or changes via his CRT, building a "log" of the broadcast day, Swanson said.

The next day, a printed version of the log goes back to the traffic department, where all changes are keyed in to assure clients are billed correctly and so exact air time – an invoice item – can be included.

Once a month the Cyber is used to process all accounts receivable. The only input needed from the accounting department is the commercial number, the name of the advertising agency, the client's name and the first air date.

Input from the station is sent by the PDP-11/05 to Colorado Springs, and the Cyber prints out the appropriate invoices on the station's printer.

Editorials

Hidden Documents

The recent revelation that IBM may not have opened its files completely to Telex Corp. during the discovery phase of the Telex vs. IBM [CW, Oct. 1] case is a serious charge that deserves immediate investigation.

The possibility of document withholding was raised when an IBM study was uncovered in the early phases of Memorex's antitrust suit against IBM, which revealed IBM itself had considered entering the plug-compatible peripherals business.

The IBM study showed the firm estimated the costs of developing interfaces for other vendors' systems to be high in terms of both manpower and resources.

However, all during the Telex case and particularly in the appeal of that case, IBM's lawyers argued such expenses were in reality "trivial."

It is clear Telex would have used this internal IBM memorandum to support its contention that such interface work was expensive – if the firm had had the document at the time.

The question to be resolved now is whether IBM intentially "hid" the document during the discovery phase of the Telex case or whether Telex merely overlooked it when sorting through the millions of documents that were made available to it during discovery.

In large business law cases, each side has a responsibility to the other to make available certain documents that bear on the case and only to withhold those that clearly have no relevance or that are privileged in some way.

The lawyers and businessmen on both sides have a responsibility to make sure that documents relating to the case are kept safe while the case is proceeding and that they are freely made available to the other side under the necessary court orders.

The evidence in this case is unclear at present, but it appears the documents were somehow overlooked by Telex in its search of the files. After all, if IBM wanted to keep the documents secret, it would also have kept them out of the Memorex case.

However, the possibility of deliberate withholding of the documents cannot be dismissed without an investigation.

This should be undertaken immediately by the federal district court which originally heard the case.

'Nuff Said

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Letters to the Editor

Editorial on 5100 a Disservice To Small User, Software Houses

The editorial regarding the IBM 5100 [CW, Sept. 24] did a great disservice to small business users and software houses alike.

The device is a microcomputer with add-on storage, an operating system and language interpreters to support two of the highest level interactive languages available today (APL and Basic). This is, in my view, a far cry from being "too specialized."

The statement, "This is actually a custom-tailored, problem-solving system best suited for complex environments," was not only a contradiction, but a critique few maxisystems could live up to.

The comment regarding the available software for the 5100 was bunk.

If "these capabilities [purchase analysis, forecasting, profitability analysis, budgeting, financial projection, etc.] are way beyond the needs of a small Cobol business user," something must be very wrong – either with the business user or with the editor's view of what the Cobol user should be doing.

A third possibility is that Cobol doesn't let the user do these analyses and projections as easily as an interactive system such as the 5100 would.

Classifying the 5100 and other machines as programmable calculators merely begs the question of what a computer is.

The capabilities of communicating with other devices and CPUs, of alphanumeric processing and of the storing of data and programs make it a computer in my eyes, regardless of how a user may actually utilize it.

Even the maxisystems started by supporting one user at a slow processing speed.

If IBM has avoided any impact of the 5100 on the small business user, this merely strengthens the position of us Independents. This is because we have a service which does not compete with IBM, but nevertheless extends the bounds of their 5100 to include the small business user. This is a chance we should not pass up.

Bernard Werner

Edinboro, Pa.

Article Simply Free Advertising

The article entitled "Three Users Find SMF Inadequate" in the Sept. 24 issue was a cheap shot at IBM and a clever way for Whitlow Computer Systems to get free advertising. The lead stated SMF failed to do what it claimed to do, which is proven allegedly by three users' hardware monitors.

The article showed how much faster Syncsort was over the competitors' sort programs, etc., definitely a sales technique for Whitlow.

The closing of the article polished up the advertisement by throwing in the percentage of device time saved by using the Whitlow sort.

Good journalism should have weeded out this front page attention grabber.

Elliot S. Hamilton

Chicago, Ill.

Mini Used to Generate Fear

The article, "Passage of Abortion Law Credited to Mini Data" [CW, Sept. 17], boasted that Barbados has passed an abortion law as a result of the information generated by a minicomputer.

The painfully inhumane attitude of this article deserves a response. How can taking the life of another human being for any reason be considered just or good?

Our Supreme Court said the child in the womb is not a person; but they said the same thing about the black people in 1857 (Dred Scott Decision). Did the court decision make it just for the black salves to be subject to death and torture by their "owners"?

It is unfortunate the minicomputer was used as a tool to generate fear – a selfish, depraved fear.

David A. Fuller

Renton, Wash.

IBM Spending Cash on Real Estate

In reference to the article, "IBM Attempting to Diminish Embarrassing Cash Hoard," [CW, Sept. 17] one of the reasons IBM has only $4 billion in cash is it has been buying a great deal of real estate in the past few years.

Philip F. Burns

Wellesley Hills, Mass.

Programmers 'Hooked' on 3000

Congratulations to Charles Rice and Don Stoneman for an excellent accomplishment in extending their programming capabilities with their IBM computer ["Small Shop Builds Programming Palace," CW, Sept. 10].

For small users who would like to have the same type of capabilities in the $175,000 to $250,000 hardware price range, I would recommend the Hewlett-Packard (HP) 3000.

After a year of using the 3000 in the manner described in the article, our programmers are hooked. We didn't install the 3000 just to get a "programmer's palace," but that was certainly one of the things that came with it.

William L. Flack

Memphis, Tenn.

Internal Pressures

I've been asked by six people – three academics and three Japanese – to explain the phrase "internal pressures" that I use in describing IBM actions, especially as regards announcement of major new prdoucts and systems. It puzzled me a little to get the Japanese inquiries, because Japan is a very IBM-like country: the family-type commitment, the necessity for final consensus, the great concern for appearances. I would have thought the decision processes involved would be very familiar there.

The messy politics and open power struggles in Academe are much different, but even there the prevalence of nonrational elements in resource allocation and support solicitation is a link to what goes on inside the incubator of All That Is Good.

You see, the normal profit-maximizing arguments don't really apply in IBM. A perfect example was the 360 announcement back in 1964: if they announced a radical new system, the stock would go up – "IBM again demonstrates its leadership." If they announced a compatible new machine (the 7095) the PR boys would play Customer Concern on their kazoos. And if they announced nothing, the security analyst community would be encouraged to perceive the increased cash flows due to the extension of the 7000-series lease period! All choices led up.

What happens instead of Adam Smithian economic calculations is a highly personal and, especially nowadays, nationalist power struggle. The development laboratory, the not-fully-occupied manufacturing facility, the executive who has not had a major success for some years contend in the arena for prestige and precedence. Not for survival: the Dutch engineers, the British software artists, the California veterans all will remain in IBM. But lower on the world totem pole; shipped off to some horrible location without a country club – or even, Poughkeepsie!

The parameters of that struggle used to be rather more unusual, in the eras of the Watsons. The Old Man was keen on physical appearance: the blue-suit-white-shirt syndrome, the clean machine area, an artistically arranged set of executive photographs.

Tom Junior was a yachtsman, and fellow sailors did well. Both men favored tall, impressive males and Doris Day females; Steinmetz would have done poorly in the development derby!

Today things are somewhat less intimate. The amount of money already spent on a project, the need for support from a foreign government, the enthusiasm that can be generated in a division or corporate-wide sales force are quoted in the management councils. An unusual photo safari or a major community-betterment project still counts, though; one reason it is so hard to get copies of the many company employee publications – the plant papers, the sales newsletters – is that IBM watchers and internal faction leaders can interpret "family" stories too effectively.

It's a salesman's world: highly personal, closely knit, gossip-ridden. And optimistic – very optimistic. The conservatism of the circuit designer, the gloom of the accountant, the misanthropy of the lawyer have little influence; the desire to clobber the competitors, to win 'em all, is dominant. If tools are available to achieve that dominance – a nonstandard input medium, an impenetrable software security system, a radical new applications package, and, of course above all, a totally new computer family – well, those tools will be used. And it will be internal pressures, not the usual external ones, that govern. IBM internal pressures become *external* pressures on the Amdahls, the ICLs, the Texas Instruments; we all see that. But it is at the earlier stages, when still internalized, that forces within IBM bear close watching.

Herb Grosch

What About It, IBM?

Releasing Statistics Could Aid DP Fraud Prevention

An IBM corporate spokesman recently denied the accuracy of the reported 1974 DP fraud figures of $200 million [CW, Oct. 1]. The publication of the figure, which IBM called "unfortunate," allegedly came from a leak out of a National Bureau of Standards subcommittee.

Here IBM's manager of security, Robert Courtney, had conversationally mentioned he had 339 press reports, conversations with others and equally informal, unreliable entries regarding computer occurrences.

The Taylor Report By Alan Taylor, CDP

Courtney had no better information than that and never intended the figures to be published. So the spokesman's story went.

Digging, however, suggested that IBM has got the wrong end of the stick and the $200 million figure is justified or understated.

Take, for instance, some of the statements Courtney made in his earlier Atlanta speech before the Data Processing Management Association (DPMA) convention.

In the speech, Courtney appeared to be at least condoning, and perhaps positively supporting, the nonreporting of fraud cases.

"I am not suggesting you should report the rest of it," he told the audience, referring to the 85% of the 339 cases he somehow knew had not been reported to law enforcement.

He also apparently knew crimes had been committed and criminals detected but not reported. That is not the type of knowledge one gets from reading press reports.

Perhaps $187,976,500?

Nor did Courtney tell the DPMA members the figures he quoted came from such unreliable data as press reports. In talking about the dollar figures, for instance, he said: "Of the 339 cases which I saw last year, the average take was $554,500." Multiplied out that is $187,976,500 – nearly $200 million.

Indeed, he was quite positive he personally saw these cases. He used his seeing cases "as an individual" to differentiate his figures from those of actual computer-related fraud cases nationally. He argued frauds that are undetected or unknown to him made it impossible to estimate the real figures. The 339 $554,500 figures, he insisted, are simply the ones he as an individual saw.

Did He Exaggerate?

Now, it is possible Courtney exaggerated a bit in his DPMA speech. But it seems unlikely he could possibly have obtained the information he had about the cases from the unreliable sources the IBM spokesman described.

For instance, take his attack on the internal auditors. Here is how it went:

"So what do we know about these frauds? Now I guess I'm not very diplomatic, and I don't mind saying too much. In all 339 cases that we saw in 1974 and in almost the same number in 1973, there was not one instance in which the internal auditors were in any way involved in catching these people or in warning management there was a potential exposure. To that extent, the auditors had an absolutely perfect record."

Now, press reports and conversations just don't entitle one to claim negative knowledge, i.e., that the internal auditors had *not* been involved. That type of knowledge is only available to insiders – to people who are able to investigate and ask questions about the fraud, even though it has not been reported to the Federal Bureau of Investigation.

In short, it simply wouldn't be available

"So we are left with the question of what to do in the future . . . That $200 million/year now turns out to represent only a portion of the frauds that are taking place. The real figure is much higher."

if the list were a collection of raw random data, as IBM is now claiming.

And the DPMA speech also showed that Courtney actually knew more about these cases. He knew not only what the auditors were not doing, he also knew what type of technology was not used to carry them out, as well as where the culprits actually worked.

This is another part of his speech: "What else do we know about those 339? . . . I do not know of any cases of real economic impact or serious operational upset as a consequence of a technologically elegant intrusion. Every one of the cases I know about were people that were doing rather simple-minded things. A high level of technical competence was simply not required. The vast majority of them were simply people misusing system resources they were already authorized to use.

Who rips off payroll? People who are authorized to modify or work with payroll. And who steals from accounts payable?"

Now that doesn't sound as though it came from someone who wasn't using reliable data. That sounds as if it came from someone who knew what he was saying.

So we are left with the question of what to do in the future, avoiding the question of why on earth IBM should now be trying to downgrade the $200 million fraud figure. That $200 million/year now turns out to represent only a portion of the frauds that are clearly taking place.

The real figure is much higher. And it is realizing this fact that will make us aware of the high incidence of fraud and, hopefully, how to take action against it.

The community needs more information from people like Courtney on a regular basis. His comments on the use of structured programming, for instance, are interesting on a technical basis now. How much more interesting they would be if he could report next February that no structured programming applications had been included in the 350 detected frauds? Or even that 50 of the 339 frauds might not have occurred under structured circumstances? Or that structured programming made no difference?

What the DP profession needs to combat fraud is the immediate release of the descriptions and statistics that Courtney has and that IBM apparently doesn't want us to believe.

What about it, IBM? Will you play the leading role in stopping computer fraud that you could by simply freeing analyses of detected fraud cases? It would greatly help everyone and wouldn't hurt you either.

Reader Commentary

New Fable Version Shows
Efficiency, Maintainability Equally Vital

By Jonathan Sachs
Special to Computerworld

I must take issue with Miles Benson's fable "Choice of Efficiency or Maintainability Subjective One" [CW, Sept. 10].

Benson's basic point – that either efficiency or maintainability can be of prime importance, depending on the application – is undeniable, but he made some assumptions as pernicious as the prejudices he was fighting.

To summarize the fable: Byron Iconoclast and Samuel Smoothdog were programmers at the Clever Devil Toy Co., which contracted to write a hardware analyzer for General MPG, a large automotive concern.

Byron started the job, but his behavior offended General MPG and he was replaced by Samuel in midstream. Due to differences between programming styles – and the unsuitability of Samuel's style to the task – the project was a total failure.

Byron wrote super-efficient Assembler code; he was happiest when buried in a nest of source listings and core dumps. Samuel used only high-level languages, wrote code that could be read like a novel and documented every move he made.

Each man's vices reflected the other's virtues. Byron's code was efficient but specialized; it had few comments and was never documented. Samuel's code was generalized and well-documented, but not too efficient. After all, "you can't ask a general-purpose man to service nanosecond-dependent interrupts," right?

Wrong.

An efficient program need not be unreadable, difficult to modify or even specialized. A generalized program need not be written in a high-level language or be slow.

When we write a program, we should choose positions on many scales, among them generality, language level and efficiency. Our choices interact, but they aren't lashed together into a single variable.

Yet many people fall into the trap of making a simplistic "Byron or Samuel" decision that has little chance of fitting the task at hand.

Two Sides of Mirror

Part of Benson's problem seems to be that he viewed Byron's and Samuel's bad points as somehow inseparable from their good ones. As common tendencies, their bad points may have been related to their good ones, but no one should have accepted them as immutable.

And that is what Byron's and Samuel's boss did. He cherished the two for their strengths, while their weaknesses were, well, catered to.

As a result, Byron and Samuel were like two sides of a mirror. It was a warped mirror, and neither side worked properly.

No one can be expert at everything, but anyone who claims to be a professional should be minimally competent at everything in the scope of his profession. At least he should realize when he's in water over his head.

That is most unlike Samuel, who, Benson placidly observed, was the last party to realize that a hardware analyzer can't be written like a payroll package.

Another Version

Let's consider a version of Benson's fable in which Byron was more diplomatic and didn't offend General MPG so much that he had to be deported.

He finished the analyzer and General MPG signed it off. After using it a while, the company decided to get faster disk drives for a few heavily used files and a two-channel controller for some of its tapes. This stuff increased its throughput by 40%.

Now General MPG's staff had to adapt the analyzer to the new hardware. When it looked at the source code, you could hear them howling in the next county. It was a rat's nest of self-modifying instructions, nonstandard linkages and humidity-dependent subroutines. Of comments, nary a one.

The analyzer couldn't handle a two-channel controller; after all, when Byron was around, there wasn't any!

No one could figure out how the analyzer found device addresses, so the staff patched in a new routine that checked every I/O event and fudged things so the analyzer didn't know the two-channel controller was there.

Next the staff changed the analyzer's device table to support the new disks. When it ran a test, the analyzer wiped the system residence pack and turned on the sprinklers in the tape vault.

It seemed the table didn't control device characteristics for the *whole* analyzer – just for the modules that could access it efficiently.

The staff poked around some more and found the disk arm seek tracer was written around assumptions that, for the new disks, were just not true. After weeks of trying to figure out the tracer's connections to the rest of the analyzer, it called Clever Devil back in.

No Help at All

Clever Devil wanted to help, but it couldn't. Byron had moved to Alaska and no one else knew how the analyzer worked. Byron being Byron, there was no documentation.

General MPG gave up trying to monitor the new disks and patched the analyzer to ignore them. Then it ran – sort of – but it never produced useful output again. Despite General MPG's best efforts, the tape drive patch made it so inefficient that it couldn't keep up with the system.

So Byron killed the project just as dead as Samuel. He just killed it a little slower. Clever Devil escaped legal liability, but it won't be likely to get another contract from General MPG.

Two Morals

This fable has a couple of morals. First, the job was one where maintainability was just as important as efficiency. Byron killed it by failing to grasp that, just as Samuel killed it by failing to grasp the converse.

Second, Byron's "efficiency" at the expense of maintainability was self-defeating. After a little exposure to the real world, his program turned out to be neither efficient nor maintainable.

Byron and Samuel can't be blamed. If anyone can be blamed, it's their boss, who kidded himself into thinking he had a couple of genius programmers when he really had only two halves of a programmer.

Accrediting DP Centers Would Ensure Data Integrity

By Douglas A. Webb
And Robert P. Abbott
Special to Computerworld

Because of the new Privacy Act and the Freedom of Information Act, greater emphasis will be given to ensure data integrity in DP installations, that is, to ensure data is accurate and has not been altered, disclosed or destroyed.

But how is data integrity measured? Who says an installation's data is protected? How can DP managers, government agencies and private citizens measure the capability of an installation for protecting data from misuse?

One approach to answering these questions is through accrediting computer centers for data integrity.

Accreditation is a means of determining the level of data integrity a computer center has, as measured against a stated practical norm – a norm beyond that which says no one can misue a data bank.

Accreditation is not a method of establishing a yes/no 100% answer to the question of a computer center ensuring data integrity. The accreditation approach is an attempt to have technically competent professionals make meaningful statements regarding the level of data integrity provided.

We suggest an accreditation commission, similar to the Joint Commission on Hospital Accreditation, be formed to perform the following functions:

- Supervise the production of a data integrity norm of computer centers by establishing the general principles, objectives or goals of computer center data integrity; setting standards that support and define the principles; and developing interpretations and guidelines that explain and give practical examples for applying the principles and standards.
- Monitor the data integrity provided by computer centers through establishing a formal accreditation methodology and performing accreditation surveys and reporting the findings on an ongoing basis.

The accreditation commission can be formed through action by either Congress, government agencies or the data processing industry. The members of the commission need to be DP professionals. This will help ensure the data integrity norm is meaningful and the reviews are performed by peers.

Reader Commentary

The principles, standards and interpretations of the accreditation process can be modified periodically as times and needs change. The commission would solicit opinions and recommendations from various government agencies, DP societies and consumer advocate groups.

The accreditation commission can assign capable people or go themselves to visit an installation and make an evaluation of the data integrity provided by the site.

The evaluation survey is made relative to the established norm. This norm is defined in terms of general principles, supporting standards and specific interpretations.

The installation can in part set the level of accreditation as they deem necessary and define the need for data integrity. Some aspects will be set by others – the commission, Congress, individuals, the National Bureau of Standards (NBS) or the industry itself.

The period of accreditation could vary from daily examinations to one every two to five years. This will depend in part on the installation as will setting the level of accreditation.

Auditing by CPAs

Formal auditing by certified public accountant (CPA) firms serves a somewhat similar function to the accreditation process. CPA firms give opinions on the accuracy and fairness of the financial reports of companies. The CPA report or opinion is a statement made by a recognized, capable and competent firm attesting that they have examined or audited a set of listed items, made the examination in accordance with generally accepted auditing standards, included necessary tests of the items and reported any items that do not conform with generally accepted accounting principles.

The notion that a CPA firm is certifying items implies a legal responsibility, and this aspect is conspicuously absent in accreditation. However, there are numerous useful ideas and procedures in the field of auditing that could be applied to the accreditation process.

Precedent for Accreditation

There is an established need with the new Privacy Act and the Freedom of Information Act to implement some form of evaluating or measuring data integrity within computer centers.

There is also an historical precedent for a commission-type of accreditation. Specifically, mandatory accreditation was imposed on hospitals by the Medicare Law.

The approach is flexible; it could be voluntary to some, mandatory to others. It does not have the stigma or real problems of legal requirements; that is, it can be modified without a lot of red tape.

The standards apply to all installations, but both the methods and the accepted level of meeting the standards will vary.

Installations will find the approach provides a useful index for evaluating their level of data integrity. A systematic evaluation by a peer group shows an installation has collaborated to seek excellence, accepted outside appraisal and demonstrated conformance with professionally developed and nationally applied criteria.

Numerous areas require attention before accreditation can become a reality. First, levels of accreditation must be determined. Then the costs for each survey, for implementing necessary recommendations and for maintaining data integrity must be identified.

Next, the principles, standards and interpretations to be used at installations must be set. A formal methodology for implementing these needs to be established.

Finally, a statement of accreditation must be prepared, and those who will make up the commission and who will make surveys can be appointed.

On the staff of the Lawrence Livermore Laboratory, Webb and Abbott conducted a study of accreditation for the U.S. Energy Research Development Administration under a project titled "Research in Secured Operating Systems."

SOFTWARE&SERVICES

CW at CPEUG

About 130 people from government, industry and the academic world attended the 11th meeting of the Computer Performance Evaluation Users Group (CPEUG) in Oklahoma City last month.

Topics covered included everything from getting started in evaluation work to discussions of the relative merits of various statistical analysis methods.

Copies of the proceedings of the 11th meeting, as well as a number of papers from earlier CPEUG meetings, are available for $6 (prepaid) from John F. Wood, National Bureau of Standards, Building 225, Room A247, Washington, D.C. 20234.

CPEUG Keynoter Warns

Studies Must Be in Management Terms

By Don Leavitt
Of the CW Staff

OKLAHOMA CITY, Okla. – Politics and personalities are just as important in effective computer performance evaluation (CPE) projects as technology, according to the U.S. Air Force associate director of data automation.

Keynoting the 11th meeting of the Computer Performance Evaluation Users Group (CPEUG) here last week, James H. Burrows said CPE is made up of "three Ms: measurement, modeling and management.

"It's always been a disappointment to me that most of you forget the last one. You know a lot of the technical aspects of your jobs but you just don't set the stage to help your managers," he told attendees.

"Until you can find ways to create a real understanding of what you're doing – or trying to do, you'll still be an outsider when those managers need you," he warned.

"Unless you people learn to work with management, you'll remain an expensive and questionable factor. Right now, you've got a nice little playpen," he commented, "but it won't last if the boss doesn't know what you're able to do for him."

Measurement Not Enough

Measurement by itself can't help the manager, according to Burrows. Currently, hardware monitors with the facilities users really need "cost at least $100,000 and most DP shops just can't afford that kind of money."

Even if an installation can afford a monitor, there just aren't enough people around with the technical skills for every installation to utilize such equipment, he added.

Software measurement routines are also limited in their value, Burrows went on. Job accounting and billing facilities are among the most common of these tools, but "they've got to be more rational than they are now."

The Air Force has a wide range of CPUs, and a standard billing mechanism that would apply from one type of CPU to another would be very helpful, he said.

Beyond that, however, consistency should be a benefit to all users, Burrows added.

Users in meetings such as CPEUG's have a very difficult time talking to one another if they use different CPUs because of differences in measurements built into their software systems, he noted.

"Honeywell has far more precise data on I/O than IBM," he said, but other "stuff" Honeywell collects "doesn't make any sense at all."

Even a single vendor will often alter the accounting algorithms from one release of an operating system to the next, the Air Force spokesman continued, "and when that happens, a user can't even compare data collected last month with data collected today."

Modeling's Own Jargon

Even if the measurements are consistent and useful in the technician's eyes, "How do you make yourself useful to the manager between mainframe upgrades and configuration modifications?"

Modeling is a useful CPE technique, he

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Special Software Keeping Bell Tuned

By a CW Staff Writer

OKLAHOMA CITY, Okla. – Commercially available software monitors are good measurement tools, but Bell Telephone Laboratories also uses hardware monitors and some "very specialized software monitors" to keep its IBM, Honeywell and Univac equipment well tuned, according to J. Michael Jenkins, head of the lab's Systems Analysis Department.

Some of the special monitoring routines were developed to learn about systems in general and to try to get a feel for what was really going on inside the blue box, Jenkins explained to a general session of the Computer Performance Evaluation Users Group (CPEUG).

A program called Systems Analysis of Virtual Operating System (Savos) was built "almost as a toy" to gain a better understanding of IBM's VS environment. Savos mapped users' Virtual Storage, showing which pages were moving in and out of real memory, which were in V=R, and which were operating system pages.

Samples were taken once a second, and the collected data was posted to magnetic tape. It was then processed through a computer output microfilm (COM) device modified to produce movie film.

When the movie was run – eventually at a slower than sample pace – the pattern of movement in Virtual Storage was vividly evident. At the meeting Jenkins showed clips of the mapping done on an overinitiated IBM 370/145 which was thrashing badly and of a stabilized 370/158 with a spectrum of service capabilities, handling them all well.

Graphic Output

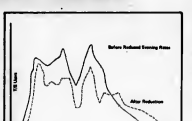
Another software system reduced workload statistics to graphic output, and the pictures Jenkins presented included the load throughout the system's day. The classic peaks and valleys were there, with sharp falloff after 6 P.M.

A change in the billing algorithm caused a decided drop throughout the prime shift and "a very satisfying" increase in evening usage, all of which was documented with the special monitor software.

The user initiated moves to the evening, and a drop in games being played was enough to delay a system upgrade for "about two years," Jenkins said.

In another instance, tape drive usage was monitored and graphically reported, providing management with an immediate awareness of very heavy use between 11 p.m. and midnight every night and com-

(Continued on Page 20)



Plotting of time-shared usage before and after a change in Bell's rate structure confirmed success of strategy to move users into nonprime time.

NBS Mulls CPE Manual for Univac 1100/Exec 8

By a CW Staff Writer

OKLAHOMA CITY, Okla. – A working group at the National Bureau of Standards (NBS) believes there is a need for technical manuals of computer performance evaluation (CPE) information for the major systems, and the structure of one such document – for the Univac 1100 Exec 8 operating environment – has been processed.

This particular project is still at the feasibility study stage but, if it succeeds, NBS will then "hopefully" produce comparable manuals for other systems, according to Dr. Robert S. Butler of the bureau's Institute of Computer Science and Technology.

Butler focused on the Univac 1100 series first because NBS has an 1108 which is useful as a testbed for the concepts and techniques to be covered in the manual.

Beyond that, he added, the Univac 1100/Exec 8 represents a "typical third-generation system that is popular in the Federal government, but not widely studied using CPE techniques."

Butler told a technical session at the Computer Performance Evaluation Users Group meeting here recently he would welcome comments and CPE studies on Exec 8 systems from Univac 1100 users anywhere, especially material related to job accounting analysis and measurement software that users have at their own installations.

'Not a Cookbook'

The manual "will not be a cookbook" in the area of CPE for even one line of hardware/software systems; it will, instead, be a compendium of approaches and techniques that have been tried and found useful, Butler said.

But the user will be left to choose what parts of the books, if any, are applicable to a particular situation, he added.

The manual, whenever it may be published – and "that's very much up in the air right now," Butler admitted later – will start with a discussion of alternative approaches to CPE, regardless of what system is studied.

A general methodology for computer performance improvement will be proposed, the NBS spokesman noted.

The next section, on evaluation criteria, will define performance criteria in terminology specific to the Exec 8 system. It will propose working definitions for parameters such as throughput, response time and resource availability, he went on.

(Continued on Page 19)

Simple CPE Strategy Avoids Upgrade at USDA Center

By Don Leavitt
of the CW Staff

OKLAHOMA CITY, Okla. – The simplest strategy for getting into computer performance evaluation (CPE) is to "start at the beginning and move up," according to the analyst who did just that at the U.S. Department of Agriculture (USDA) data center in New Orleans.

With this approach – and the strength of his position on the staff of the center's director – Richard T. Eckstein has been able to sharply increase the workload of the center's IBM 360/65 without saturating the system.

And an upgrade to a 370 which seemed inevitable 18 months ago has been indefinitely delayed, he told a session at the Computer Performance Evaluation Users Group meeting here recently.

Increased hardware costs have not been completely avoided by Eckstein's analysis of the system. There have been significant configuration changes, but more important – in his eyes – have been the great changes in attitude of the personnel at the center.

In early 1974, when the system appeared to be saturated, it was logging 160 productive CPU hours "and just couldn't do anymore."

Now the staff members work all month long to push the system as hard as it can. It anxiously waits for posting of the month-end "stats" to see how close it's come to the 307 productive CPU hours Eckstein now believes is the modified system's saturation point.

CPE should start, he maintained, with an understanding that reports on the number of jobs entered into the system, the amount of time needed for turnaround by job type, the number of system crashes, the amount of idle time within initiators, the number of tapes mounted and the number of hardware crashes can all be helpful.

All this data is available under IBM's OS. Making a "simple modification" to the operating system, the console log can be written out to tape, he explained,

CW at CPEUG

allowing almost all of these reports to be generated on the computer with a fairly simple data reduction program.

Job Accounting Routines

Another area for collecting data about performance is in the system's job accounting routines, he went on. Information on CPU utilization is available there, and so is the amount of time, core and other resources utilized by job, group of jobs or a system.

At the USDA data center, the CPU use report quickly showed the effect of a change in the overall system while the listing of number of jobs and total time used, by class, gave Eckstein a clear indication of where a bottleneck was before the system was tuned.

In attempting to gain faster service, most users had called for the same range of high priorities for their own work. A restructuring of the class structure and application of dollar costs for core used helped smooth out that situation, he said.

After analysis of accounting data, software monitoring can be used to give details of the internal operations of the operating system and of the application programs.

These tools do impose some overhead of their own, however, so they are not used for extended periods of time, Eckstein commented.

Hardware Monitoring

Hardware monitoring is the next step in the analyst's approach to CPE. The data collected through external probes into the hardware circuitry imposes no overhead and can be usefully displayed on a Kiviat graph form so that general management can easily visualize changes in the basic operation of the system. .

Once the staff and upper management have been brought up through all those stages of CPE potential, they should be ready to comprehend the concepts and the possibilities inherent in modeling and simulation, Eckstein said. It is too late to use this range of tools once a system is saturated if the goal is analysis of cost vs. performance.

But modeling/simulation can save time and money in determining the effect of hardware and software developments before they have been implemented. Such studies may, for example, show clearly the cost of a proposed change cannot be justified by the best possible performance improvement it can provide.

Mistakes in unjustified hardware or software modifications can be extremely costly and are best avoided, Eckstein reminded the group.

Talk to Managers, Keynoter Cautions

(Continued from Page 17)

went on, but it has a jargon all its own.

"Does your boss understand your models? Do you, if you're really honest with yourself? Is it the simplest it could usefully be? Is it accurate?" he asked.

The folklore of data processing is faulty, and each area within DP seems to have its own misconceptions, he said. Many managers still seem to think that the more jobs on a system, the faster the system will run.

Who but those in CPE can get rid of that misconception? Burrows wanted to know.

It is true, he acknowledged, that "most systems could do at least one and s half times more work than they are now just with proper scheduling."

On a more detailed level, he asked, "who checks programmers' code to see if it runs well? Is it checked in isolation, or in conjunction with everything else that may be running with it?"

Rewriting systems can't be done – effectively – without considering the rest of the workload, he said. In one case he knew, a job that took 17 days to run in batch mode was rewritten to go on-line with CRTs "to speed it up."

The new version took six months to run, Burrows noted.

The effectiveness of a CPE group is often pegged to its place in the organization. If it only reports to the head of DP every six months, it will have no real impact, Burrows said.

Sponsor Pondering New Segments

Non-DP Students Affecting Direction of CPE Classes

By Don Leavitt
Of the CW Staff

OKLAHOMA CITY, Okla. – About 500 managers have been through a one-week course on computer performance evaluation (CPE) offered by the Department of Defense Computer Institute (DODCI). But the makeup of the student body and the course content keep changing, according to the course coordinator.

The course was organized three years ago. It is open – without cost – to people working for Federal, state or local government agencies or for organizations having contracts with government agencies, Terrance M. Losonsky told the recent Computer Performance Evaluation User Group (CPEUG) meeting here.

The original students came from senior-level technical DP environments. Currently, however, there is increasing interest and enrollment among non-DP specialists such as auditors, project officers, contract monitors and management information specialists.

And that shift probably is a good thing, Losonsky indicated.

On the other hand, the shift in student makeup and "a suspicion DODCI's dependence on guest lecturers may cause some of them to get 'burned out'," has left him with a feeling the course content needs further "tuning."

Refresher Course

The first morning focuses on computer system architecture. A refresher course not directly on CPE, it covers multiprogramming, multiprocessing and queuing theory, Losonsky explained.

A session on the use of accounting data for performance management, after lunch, was designed to make the students aware tools are easily available and to show what the results of using these tools can be.

The first day ends with a discussion on the framework of an analysis effort. This segment of the course emphasizes there has to be a goal before any measurement work has any useful purpose, he said.

The second day starts with a session on hardware monitors. A "real gutsy, detailed where-the-probes-go" segment, it is very popular with the general management-level students, Losonsky noted with a sense of surprise.

The rest of that day covers benchmarking, including synthetic benchmarks; ways of presenting CPE data and conclusions to management; and techniques for optimizing program source code.

The third day opens with a session on software monitors, then moves into a discussion period on actual CPE experiences in the Army. This is designed to show the students some of the good – and bad – things they may encounter when they apply the techniques they have studied.

Simulation of computer systems is covered the third afternoon and this has had mixed reactions from the students, Losonsky said. The general managers seemed unimpressed; the technicians liked it, he said.

Marine Corps instructors have covered interpretation of performance monitoring data on the fourth morning. As a case study, students are given the goals of a CPE effort and data collected, after which they draw their own conclusions.

Common sense techniques for improving computer performance – the next portion of the course – varies with each class. This is one of the blocks of instruction that may temper possible overenthusiasm for the more elaborate techniques, Losonsky noted.

The payoffs of using operational analysis and configuration management techniques and the subtleties of managing computer performance take up the remainder of the fourth day and the start of the fifth day.

Consideration of the capabilities and facilities of the Federal DP Performance Evaluation and Simulation Center (Fedsim) mark the end of the course material by noon on the fifth day.

Such a brief course might be the "little bit of knowledge" that would make the students "dangerous" when they return to their normal jobs, Losonsky told CPEUG. But cost justification is expected to be part of each presentation, to keep the students "in touch with reality," he added.

CW at CPEUG

NBS Mulls Manual On Univac Tuning

(Continued from Page 17)

From there, the proposed manual will go into performance improvement options "and it is this section that emphasizes our belief it is impossible to write a useful 'cookbook,'" Butler said.

"There are simply too many variables: different configurations and workloads, local modifications to the Exec and different releases of the operating system.

"The best we can do is to identify a number of options and suggest a method for choosing among them," he said.

To help organize a user's thought process, the option section will be subdivided into considerations on hardware, the operating system, data center operations and application programs.

Measurement Facilities

The next section – on measurement facilities – will discuss observation, accounting log systems, software and hardware monitors and workload drivers, Butler continued. In all cases, he emphasized, generally available tools will be specifically named and discussed. Procedures for validating each tool will also be given.

In the analysis section which will follow "Measurement," available simulation, analytical and statistical tools will be discussed in detail, according to Butler.

DP Needs Sense of 'Contribution, Not Mystique'

By Don Leavitt
Of the CW Staff

OKLAHOMA CITY, Okla. – Computer usage has sufficiently matured, according to George L. Whalley, "to begin steering away from technology toward greater efficiencies, improved performance on what we have, and to begin developing a general philosophy of contribution rather than mystique."

Deputy director of the Office of DP Operations at the U.S. Department of Housing and Urban Development, Whalley told the recent Computer Performance Evaluation Users Group (CPEUG) meeting here there is much to be learned by the DP community in communicating its performance and importance to the real leaders in organizations – those "who have no patience and little time for technical tutorials."

Establish simple objectives, he urged the technicians, and put them in simple terms: "Reduce computer downtime by 10%, train 20 people in advanced scheduling techniques, reduce time lost to abortive processing by 25%.

"Your boss will understand these objectives and you will have your accomplishments – or lack of them – measured," Whalley went on.

CW at CPEUG

Formulate Philosophy

More useful than simple objectives, however, "there should be set down a philosophy of operation which lends itself to distinct steps toward better performance, and which is known and understood by all employees at the DP activity."

In his own operations, he said, he has established some categories of effort which he hopes "will move us toward our goal of a model computer center."

Such a goal demands, first of all, that the center have the right equipment, a suitable environment, workable operating standards, adequate procedures and complete documentation.

In order to provide services – "rapid data entry, timely processing, quality products and responsiveness to situations" – the center uses certain techniques to maximize use of all resources, minimize abortive processing and conserve expenditures.

Internally the center must have the ability to modify its own organization, to change equipment, to overhaul the facility and to get systems redesigned.

This should, in turn, generate certain attitudes among the center's "customers": satisfaction with service, confidence in the center's capabilities and respect for the talent that is there.

Thanks

William J. LeTendre, outgoing chairman of the Computer Performance Evaluation Users Group, received a wall plaque for his years of service to the group at its recent meeting in Oklahoma City. LeTendre is a technical advisor with the U.S. Air Force's Electronic Systems Division.

Specialized Tools Keeping Bell Tuned

(Continued from Page 17)

paratively little activity on these devices during most of the day.

A quick review of operations room procedures showed the heavy use was caused by the copying of disk files for backup protection. By convincing the operations staff to spread this activity throughout the day, the peak was cut back and two tape drives were eventually released as excess, he said.

In yet another situation, one of the Bell System's data centers seemed to be having a breakdown in throughput, he went on. Jobs that logically should have been done within hours were at the center overnight, and there was considerable thought given to getting a new system.

In fact, IBM's SMF showed the jobs were only taking 20 minutes in the computer itself. The problem then was identified as one of human factors and not of equipment.

Some problems are not solved that simply, however, and Jenkins also described a dynamic job scheduler Bell developed for its own use.

It isn't as accurate as some of the schedulers commercially available, he admitted, but it serves a different purpose.

Most shops can schedule – accurately – what needs to be done in the next scheduling period, he said, but the lab's situation "isn't stable for more than two and one-half hours at a time."

But the scheduler tracks what was supposed to have been done up to the point trouble occurred and what was done. It then considers what is left over and what else should be done in the next period.

"But it is a recovery tool, not a long-term scheduler like the commercial packages," he said.

CW at TCA

International Communications Corp., Atlantic Research Corp. and Codex Corp. showed technical control centers at the Tele-Communications Association (TCA) exhibition. Other vendors who showed data communications test equipment included Collins, ADC Telecommunications, Spectron Corp., Cooke Engineering Co. and Infotron Systems Corp.

Specialized Carriers Cost Less But Start-Up Problems Do Exist

By Ronald A. Frank
Of the CW Staff

SAN DIEGO – Initial experiences with the new specialized carriers do produce start-up problems, but in the long run the user saves money and the service is usually good.

This was the consensus at a user panel on these carriers held at the recent Tele-Communications Association (TCA) Conference. The users agreed initial delays after service was supposed to start had been a problem.

Valley National Bank of Arizona has a 2,400 bit/sec line provided by Southern Pacific Communications Co. (SPC) between Tucson, Ariz., and Phoenix to Texas, according to Jean Blodgett of SPC. SPC provided this facility with independent modems at $300/mo less than the local phone company had bid.

Due to snowstorms, shortages of personnel and other problems, there was a three- to four-month delay in getting the Texas end of the link into operation, she said.

In addition, when DP staff members from the bank visited the local SPC site, they found there was not adequate 24-hour security to protect the transmission equipment, she told the attendees.

These problems were corrected and, after a year of operation with the carrier, the bank is satisfied with the service, she said.

Jim Palmer of Crown Zellerbach Corp. said his company initially expected to save about $6,000/mo by switching certain lines in its corporate network to SPC.

The actual savings were about $300/mo more than Bell high/low rates, but only after some problems were overcome.

Initially each local phone company would deal in its own manner with representatives of the specialized carrier, Palmer said. But this has been corrected since Bell established uniform operating procedures for dealing with all new carriers.

Since the specialized carrier provides the user with an end-to-end service, it must interface with the phone companies for local loops and other interconnections, Steve Ernst of Bank of America explained.

To avoid problems, the user should provide the specialized carrier with a letter authorizing the new carrier to act as agent for the user.

One user attending the session said the wording of the letter can be important. His company is served by a Bell national account manager. After the user wrote the agency letter, the manager said service would have to come from the local level because the agency letter had eliminated the customer's national account status.

Even though the user selects a specialized carrier, he should not abandon the phone company, Ernst advised. The user should call the phone company to work out an emergency backup plan in the event that the specialized carrier facilities fail.

Many phone companies will be reluctant, but they must work with the user since they are operating in a regulated environment and have to provide service, Ernst said.

If users keep a well thought-out backup plan in their desk drawers, they will avoid a lot of problems if a major disaster should occur in the specialized carrier link, he said.

Sharing Lines

Users who are considering specialized carriers should inquire about the possibility of sharing the lines with other users to save money. The specialized carriers are more flexible about this type of thing than the telephone company, but often the salesman does not know about all the possibilities, he said.

When asking for a proposal from a specialized carrier, the user should ask for a complete description of the facilities that will be provided, including the points of interconnection with other carriers, Ernst said.

All the users agreed points previously taken for granted when dealing with the phone company must be specifically spelled out so the specialized carrier knows exactly what facilities and service are to be provided.

Hierarchical Networks To Benefit From SNA

By a CW Staff Writer

SAN DIEGO – IBM's Systems Network Architecture (SNA) will provide users with a way to transfer many jobs previously performed at the host mainframe to other levels in a hierarchical network.

And this type of data communications system structure is the direction of the future, according to Chauncey Bartholet, director of communications products at IBM.

The need for multiple interrelated processors is going to be with us for a long time, Bartholet told attendees at the recent Tele-Communications Association (TCA) Conference.

Many organizations will insist on multiple CPUs based on principles of divisional autonomy or system backup. And some data communications networks using specialized networking solutions with modified system software and hardware have already been created by his company, he said.

(Continued on Page 22)

Users Would Gain Under AT&T Restructure: Hellerman

By a CW Staff Writer

SAN DIEGO – If AT&T is forced to restructure itself as a result of the Justice Department antitrust suit, it "will result in better equipment and service for the consumer and at lower costs."

But, even if the case proceeds fairly rapidly for an antitrust case, it will take five years to reach a decision, assuming the case is not dismissed, according to Gerald Hellerman, special financial advisor to the Senate Antitrust and Monopoly Subcommittee.

As a result of hearings held by the subcommittee, the chairman, Senator Philip Hart, introduced the Industrial Reorganization Act, Hellerman told the annual meeting of the Tele-Communications Association (TCA).

If passed, the bill would add two important "wrinkles" to antitrust enforcement procedures.

"Trustbusters would no longer have to rely on evidence that defendant firms intended to create monopolies to control prices or exclude competitors," he said. Under the bill, a firm could be judged by the result of its actions instead of its intent.

And the antitrust system would for the first time deal directly with the mechanics of restructuring monopolies such as AT&T, instead of being limited to dealing only with fines and injunctive relief, Hellerman said.

The proposed Hart bill and others now pending are designed to foster competition instead of regulation. "Regulatory agencies often stifle or restrict competition more than they foster it ... they ... have become servants of the industries they are supposed to regulate," he said.

User Involvement Urged

Despite the antitrust effort against AT&T and the proposed legislation to make antitrust enforcement more effective, users cannot afford to become complacent.

Hellerman urged users to get involved and "let the Federal Communications Commission (FCC) know that its decision so far – in allowing some loosening of the telephone company's grip on this industry – has been beneficial for your companies, their customers and the public generally. Encourage the FCC to speed up the process. This is not the time to be complacent. Communicate."

Hellerman said the Hart bill had resulted from two series of hearings held on various industries. Hearings on the communications industry helped, and users who appeared to testify had given valuable input, he said.

Although many users were ready to speak in private about customer abuses of the telephone company, there were others who gave information but preferred to remain anonymous.

Another speaker at the session was Robert Ross, an attorney for the Office of Telecommunications Policy (OTP) who said his office was investigating the privacy aspects of electronic funds transfer systems (EFTS).

"The potential for abuse of such systems lies in the possible erosion of accountability for the maintenance of integrity of an individual's records," Ross said.

An even greater danger lies in the potential secondary uses of EFTS data. This information could also be used for surveillance and "social control" purposes, he warned.

"Every time you make a credit transaction, you leave electronic footprints telling where you've been and what you have been doing," he said. OTP believes it is necessary to address these questions now, even though the EFTS industry is in an infant state.

OTP is dedicated to increasing competition rather than regulation so that users will get a greater variety of services available to them, Ross said.

In the value-added (packet-switching) area, OTP favors open entry as opposed to having users served by regulated carriers operating under tariffs, Ross said. "OTP finds no legal or economic justification for regulating" such services, he said.

Users of Hierarchial Networks To Derive Benefits from SNA

(Continued from Page 21)

SNA was designed to provide a single uniform environment for data communications users. And just as the IBM 360 architecture was carried over into the 370 family, SNA "may well outlive the hardware and software that represent its current announced implementation," Bartholet predicted.

SNA provides an environment in which applications can be designed to execute partially in the mainframe and partially in a terminal controller. This ability to process user application code in terminal controllers "can significantly reduce loads on the CPU while keeping systems control at the central site," he said.

In addition to providing management with distributed functions, critical remote processing capabilities can remain active even if the central computer fails. Interactive applications can be designed so controllers can process some requests and the CPU other requests.

Using this distributed capability, average transaction response time at the workstation can be reduced because some requests can be handled outside the central processor, Bartholet said.

Aids Problem Isolation

Common connections between system elements in an SNA network allow fixed points of reference against which to measure diagnostic output, aiding in the isolation of system problems to a specific point of failure, he said.

Because each network element has its own area of system responsibility, modifications to the system are usually isolated to a single element.

The addition of a new line need only be reflected in the Network Control Program (NCP) to which that line is attached, Bartholet said. The addition of a new user application program which will use the data communications network need only be reflected as an added resource to the Virtual Telecommunications Access Method (Vtam) control program. And every application program can be isolated from physical problems which occur in the network, he explained.

Additional terminals can be introduced into a network in a simple manner so a user can judge a workstation on its functional merits without fear that the installation will require extensive change to existing application programs.

In the future, a generalized networking system will be needed in which any terminal in a network can connect dynamically to any application in any processor in that network, Bartholet said.

Such a system would allow any kind of CPU, terminal or line control to function in the network. This might well include provisions for distributed operating systems and distributed synchronized data bases.

Ad Hoc Solutions

SAN DIEGO – "Today's proliferation of data communications software, data link protocols and general-purpose terminals reflects the hectic and widespread search for ad hoc solutions which characterized data communications in its infancy," IBM's director of communications products, Chauncey Bartholet, said at the recent Tele-Communications Association Conference.

Most of the current hardware and software products are basically incompatible. Most batch terminals and most CRT terminals cannot coexist on the same communications line because of data link protocol differences.

And lines are frequently dedicated to a single terminal type controlled by a single communications control program, Bartholet said.

Each time a user modifies a communications control system, he runs the risk of causing an old function to fail while trying to implement a new function. These dedicated resources raise the cost per terminal and discourage an organization from extending its data communications into new areas, he said.

As a result, today's communications networks are built around single applications. And, duplicate networks, each with their own terminals and multiple communications controls systems, are common.

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Terminals Outfitted for Disabled

By T.M. Whiteman
Special to Computerworld

CALGARY, Alta. – Physically handicapped persons, under the guidance of a group of researchers at the University of Calgary here, are operating computer terminals with the help of special equipment.

The equipment, dubbed Possum, was originally designed in England for typewriters and telephones and consists of a variety of interchangeable hand, foot and head controls.

One terminal equipped with Possum is currently being used as an instruction aid for students with physical handicaps.

Each of the available controls has two settings. Controls include, for example, a stick shift which can be moved to the left or right; dual rod controls; a large hand switch with two large, flat buttons; a foot switch; a head control operated by moving the head to the left or right; and a long tube-shaped pneumatic control, operated by either inhaling or exhaling.

By moving the control to the first setting, the operator can move a light horizontally across an 8 by 8 matrix. By moving it to the second setting, the light can be moved vertically on the matrix.

To select a particular character, the operator uses the control to move the light horizontally and vertically on the board until he reaches the character. When the first movement is repeated, the light returns to its home base.

According to the researchers, the Possum indicator board offers an advantage over other regular typewriter keyboards because the number and placement of characters can be tailored to a user's program requirements.

Lear Siegler Adds Modular CRT For Business Transaction Points

ANAHEIM, Calif. – A three-element modular display terminal has been introduced by Lear Siegler, Inc.

The ADM-2 display has been packaged especially for the business transaction point, such as banks, airline ticket counters and other environments where the clerk must enter and retrieve computer data without distracting the customer, the vendor said, adding all three modules can be placed where they can be used most efficiently.

The CRT can display full upper- and lower-case Ascii 128-character set in a 24-line, 80 char./line format. A total of 1,920 characters can be displayed.

The separate 119-key keyboard module contains 63 alphanumeric keys arranged in standard typewriter style, a 10-key numeric pad, 16 function keys to execute 32 standard commands and a cursor control located in a separate area as well as four transmission control keys.

Editing capabilities of the ADM-2 permit the operator to clear the screen, use a

Terminal Transactions

destructive cursor for character change and insert or delete characters or entire lines.

Total cursor control also allows the user to skip, backspace, forespace, move up and down, return, home and originate a new line, the company said.

Holds Parts of Display

One of the operating modes permits the user to hold one part of the display in a protected field and maintain it at a low light level as standard forms are filled in as part of the transaction.

The operator enters the data from the forms in the unprotected field for display at normal light intensity. After the data is entered, only the data in the unprotected field is transmitted to the computer.

The form or data in the protected field is retained in the display memory and eliminates the need to send all of the data and saves transmission time, according to the company.

ADM-2 transmission rates are selectable by a panel switch and the CRT can operate at rates from 110 bit/sec to 9,600 bit/sec.

Half or Full Duplex

Half- or full-duplex transmission mode is also selectable. A "conversation" key or a computer-generated command can be used to select either the conversation or block transfer type of transmission.

A standard RS-232C interface port or a 20 mA current loop is provided for interfacing the ADM-2, and optional RS-232C interfaces are available for printers or multidrop series terminal applications.

The ADM-2 modular video display is priced "under $3,000" and delivery is within 90 days, the vendor said from 714 North Brookhurst St., 92803.

GE Termicheck Tests Units On-, Off-Line

MILLBURN, N.J. – The General Electric Co. (GE) has introduced a terminal tester called the Termicheck for testing GE Terminet terminals, teletypewriter, data sets, CRT displays and other RS-232 devices either on-line or off-line.

The tester can be used with voltage level devices, current level devices, data sets, frequency shift keyed devices and parallel interface units.

One of these five types of devices can be programmed onto the erasable programmable read-only memory (Eprom) of the unit at the basic cost of $1,400, a spokesman said. All five capabilities could be included in a single tester at extra cost.

Portable Unit

The portable unit weighs 8 lbs and can be operated with devices that have even parity, odd parity or no parity. It can operate at speeds between 110 bit/sec and 2,400 bit/sec.

Compatible with the Terminet 30, 300, 120 and 1200 as well as the Model 33 and 35 Teletype, the Termicheck can also operate with Bell 103 or 202 data sets or their independent equivalents, a spokesman said.

First deliveries are scheduled next month from 25 East Willow St., 07041.

Firm Gets 'Free' Branch Offices

Upgrade From IBM 370/125 to 360/50 Brings Bonus

By Patrick Ward
Of the CW Staff

CHICAGO – Steel Sales Corp. got a nice bonus when it decided to replace its hard-pressed IBM 370/125 with a 360/50 instead of a 370/135.

The firm is saving $4,500/mo in rental costs, more than enough to pay for the CRTs it wanted to install in five remote branches.

Steel Sales is a steel distributor here whose five branch offices extend into neighboring states. The firm's DP department runs an on-line order entry/inventory control/gross product reporting system and handles a wide range of batch work besides.

Back in 1968, the shop began running a 360/30, which Tom Bordner, its DP director, later expanded to 128K.

When IBM introduced the 370, Steel Sales placed an order for a 370/135. The shop had tuned the 30 "to the point where there was nothing left to do," Bordner explained.

"Our next project was putting remote sites on-line, and we didn't have any capacity to do that," he said.

After further evaluation, though, Steel Sales decided a 370/135 would be too expensive in terms of the performance it could offer. The DP staff began considering a 360/40.

IBM countered with a proposal for a 370/125, assuring Steel Sales the small 370 could do the job. Steel Sales decided to order one.

A 125 proved unavailable, so IBM brought in a 370/135 on an interim basis. "We went to the integrated file adapter, but basically we kept the same I/O set we had on the 30 on the 135," Bordner said.

Steel Sales wanted 3340 disk drives on its 128K 125, but did not want to go to VS. When the 125 came in late 1973, Steel Sales used an IBM-supplied package to emulate 2319s on the 3340s – the only way it could support 3340s on the 125 without going to VS, Bordner said.

Much as Bordner liked the 3340s for their reliability and storage capacity, the experience was "terrible," he said.

The emulator needed a buffer to decode addresses and, under heavy use in the Steel Sales shop, response times soared.

Responses that took 4 sec on the 30 took as long as 40 sec on the 125, Bordner said. IBM prescribed a conversion to VS so the shop could drop the 2319 emulator.

"We went on a crash program working night and day to get into VS," Bordner recalled. "I think it is a pretty easy transition now, but at that time our installation had a lot of things that were reasonably new. We had a lot of problems."

The switch to VS did relieve some of the response time problems by getting rid of the emulator, "but it also showed us the overhead, with the VS supervisors, was such that there was not much real core with which to work.

"We were running the equivalent of a 300K partition in about 30K of real core," Bordner said. "We were running background and foreground in virtual, and background was suffering drastically."

In addition, the shop's 1,100 line/min printer was occasionally generating only 200- to 300 line/min.

Steel Sales and IBM jointly decided the only answer was 64K more memory. "That did not work out too badly," Bordner said. "Eventually the system began running reasonably well."

Branches Not On-Line Yet

But Steel Sales still did not have its branch offices on-line. The company brought in a software monitor and found the current workload was already taking 60% of the 125's CPU cycles.

The test gave Bordner "little or no confidence" the 125 had enough capacity left to bring the branches on-line.

IBM proposed a 135 but, with a rental cost $4,000 to $6,000 greater than the 125 each month, it was out of Steel Sales' range, Bordner noted.

At this point, Bordner looked around for another alternative and decided in January to lease a 512K 360/50 from Greyhound Computer Corp.

The system costs about as much as the 125 did but offers far more capacity and performance, Bordner said. The 360/50 has eight Memorex 2319-equivalent disk spindles and runs under The Computer Software Co.'s Extended DOS operating system.

The approximately $4,500/mo Steel Sales saves by not renting the 135 covered the cost of putting on-line inquiry CRTs in the five remote branches.

An ITT 3127, equivalent to an IBM 2701, handles the remote ITT terminals IBM's Faster serves as the communications control software.

A 360 user these days requires a degree of independence in the way he approaches software, Bordner observed.

"Right now I'm looking at a 3270 light pen application," he said. While it's now possible on the 50, it used to be one of the many things that could not be done on a 360, he observed.

"The third-party people are no longer just broken," he added. "In many cases they have now set up systems people to work with and help users. You're not particularly tied to IBM's apron strings anymore."

Four-Phase Adds 'Distributed Processing' Package

CUPERTINO, Calif. – Four-Phase Systems, Inc. has announced a "distributed processing" package that supports on-line entry, update and retrieval of data on its key-to-disk systems.

The package, called Data IV/70 Version 3, handles these functions and batch communications concurrently. Up to 16 keystations can interact with as many as 1,000 indexed sequential files, a spokesman said.

Version 3 will also boost the disk capacity of Four-Phase's IV/70 key-to-disk system from four 2.5M-byte units to four 66M-byte drives when deliveries of the 66M-byte drive begin in mid-1976, the spokesman added.

Version 3 has all the previous Data IV/70 features including table checks, multiple range checks, arithmetic relationships, batch balancing, cross footing, format chaining, field generation and conditional logic, the spokesman noted.

Order Entry Applications

In a typical order entry application, the key-to-disk system can be used in the branch offices of a large organization to maintain local customer and inventory files, Four-Phase said.

As customer numbers are keyed, the system automatically retrieves and inserts the bill-to and ship-to names and addresses, shipping method and credit terms. Similarly, as part numbers and quantities are keyed, the system inserts the item descriptions and unit prices, updates the on-hand inventory immediately and performs extensions.

If a part number is out of stock, the system can display alternate items for substitution. Through such techniques, Version 3 can reduce operator keystrokes by up to 90%, according to the vendor.

Data Retrieval Applications

In data retrieval applications, Version 3 enables all system operators to work simultaneously with the same current information. Records of up to 750 characters are retrieved by typing numeric, alpha or alphanumeric key fields.

In a sample file of 44,000 items, the corresponding descriptions are displayed in less than 1 sec, Four-Phase said. Any file may be accessed by all displays simultaneously.

Each display may also access multiple files simultaneously, the vendor added.

In distributed-processing applications, Version 3 may be used to generate documents such as invoices, purchase orders and sales reports.

Users can establish formats with a parameter-oriented language. The Four-Phase key-to-disk systems also offer Cobol and RPG compilers for batch processing.

Version 3 supports IBM-compatible bisynchronous communications for transmission at rates up to 9,600 bit/sec. Either dial-up or leased lines may be used with 2780/3780 protocol.

Monthly rental for a system with eight displays, 2.5M bytes of disk storage and IBM 2780/3780-compatible communications is $1,133/mo on a 42-month lease.

A system with 16 displays, 66M bytes of disk storage and a 9-track magnetic tape drive rents for $2,626/mo on a 42-month lease.

Version 3 is available for immediate delivery with disk capacities from 2.5- to 10M bytes, Four-Phase said from 19333 Vallco Parkway, 95014.

Four-Phase Systems' Data IV/70 Version 3 allows concurrent data entry, retrieval, update and communications.

Mid-Range NCR Century Users Get Hardware, Software Options

DAYTON, Ohio – NCR Corp. has announced hardware enhancements and added software options for its Century 101, 151 and 201, the mid-range machines in the Century line.

The changes include expanded core memory and the ability to use multiprogramming and high-capacity disk units on the less-expensive machines in the Century series.

One of the enhancements for the Century 151 allows the system to use the NCR B3 multiprogramming operating system. The multiprogramming system was previously available only with Century 200 or larger systems.

Other changes to the Century 101 include expanded memory; formerly limited to 64K, the system can now be expanded to 96K or 128K of core memory.

In addition, NCR announced reduced rental rates for 48K and 64K memory sizes on the Century 101.

The changes also provide increased I/O speed which allows the Century 101 to use the NCR 657 high-density disk unit. This unit gives the system approximately 60% more storage on each pack than previously available, NCR said.

Disk Unit for 151, 201

The high-performance NCR 658 disk unit can now be used on the Century 151 and 201 systems. This disk unit has also been enhanced and there is now a model which provides either a 100M-character capability or, with an additional feature, 200M characters, NCR said.

The 658 formerly was available only on the larger Century 251 and 300 computers.

As with the Century 101, multiprogramming has also been added to the Century 151.

Additional hardware capabilities include a CRT console for the Century 101 and 151.

Another enhancement allows users of Century 101 systems with core memory to upgrade to a Century 151 with MOS memory at the user site. The hardware enhancements can be added in the field to previously installed systems.

Rental rates for a Century 101 system with multiprogramming begin at approximately $3,500/mo. Purchase prices start at about $130,000.

Monthly rental rates for a Century 151 multiprogramming system begin at the $4,000 level with purchase prices starting at approximately $150,000.

GCC Merges 360/30, Disk, I/O

PHOENIX – The Greyhound Phoenix Series/30 from Greyhound Computer Corp. (GCC) is a package combining an IBM 360/30 CPU, the Greyhound Phoenix disk subsystem and the Greyhound Phoenix I/O subsystem.

The Phoenix Series/30 is available for $2,500/mo plus maintenance on a 36-month operating lease.

Included in the price is support to convert the user from smaller systems such as the IBM System/3 and the 360/20 to the Greyhound Phoenix Series/30.

The basic configuration consists of a 64K CPU, decimal arithmetic, a selector channel, a 1052 adapter, a 1051/1052 printer console and an 87M-byte disk subsystem.

Also included are an I/O subsystem, a controller, a 600 line/min printer, a 600 card/min reader, a basic extended disk operating system and GCC's conversion service.

Optional features include up to 256K memory, six-partition support, a 370 instruction set and GCC's integrated communications adapter.

The Series 30 is available in all major U.S. cities. GCC is at Greyhound Tower, 85077.

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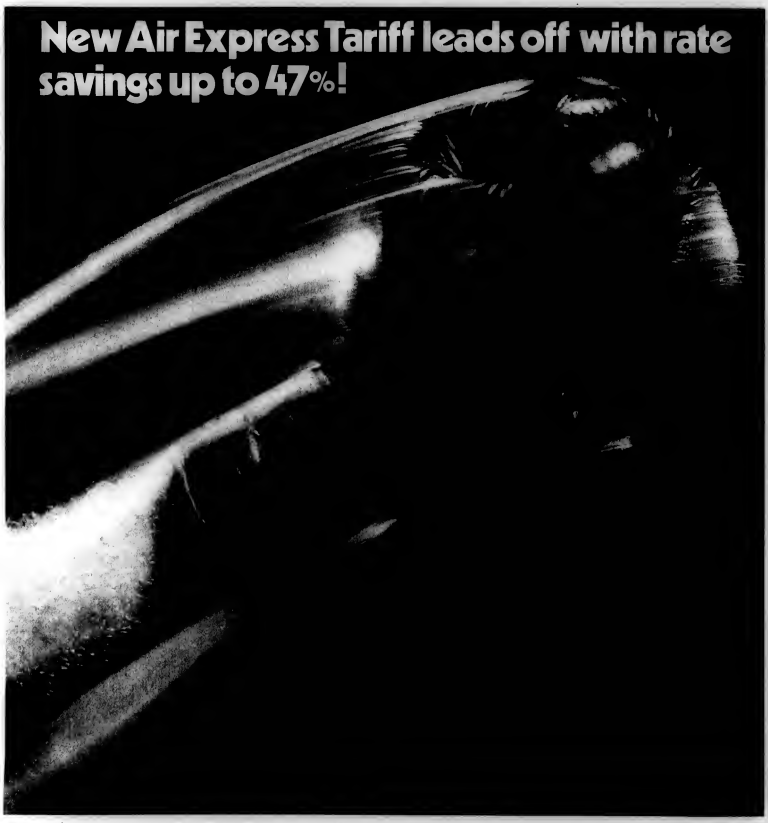

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Emery	10 94	10 94	17 35	21 74	26 10	37 20	47 24	57 16	105 86	158 79
Miami/Lexington, Ky.										
REA Air Express	7.00	9.00	15.00	17.29	22.14	32.52	38.01	47.00	72.20	108.30
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State College Still Satisfied With RCA-Built Mainframe

By a CW Staff Writer

MILLERSVILLE, Pa. – Xerox computer users may get some encouragement from Millersville State College's DP department here, which is a satisfied Univac (RCA) 70/3 user four years after RCA's exit from the mainframe business.

The state college had previously done its batch jobs on an in-house RCA 70/35 and used Comshare's time-sharing service for interactive work, according to Thomas Houser, director of computer services.

But the college's five-year plan for computing services aimed at promoting "something like a free-access policy" to time-sharing, Houser said.

"When you're buying it, the more you use the more you pay," he observed.

The five-year plan recommended installation of a 262K 70/3 that would both provide an in-house time-sharing service and replace the batch-only 70/35.

Millersville chose the RCA-built machine because "there was a substantial discount on it" when Univac took over the RCA product line, Houser said.

Beyond that, "the cost could not be beat" for the kind of software that can be run on the 70/3, he said.

The vendor-provided software was good, he remarked, "but more importantly, we found a lot of universities had been using this machine prior to RCA's exit from the business" and "we ended up trading for different pieces of software with them."

The college has also developed a number of in-house statistical packages and programs and a group of student programming consultants, under the direction of Robert S. Sauders, the school's system administrator, have converted numerous other packages from Xerox, Digital Equipment Corp., Hewlett-Packard and IBM systems.

The college DP center's users can write programs in Basic, Fortran IV, Cobol, Watfor, Algol, Snobol, Lisp, Assembly, PL/I D and F, RPG and SFOR.

Altogether, there are over 1,200 academic application packages and programs listed in the DP center's program library.

The 70/3 runs under Release 10 of the VMOS operating system, but could easily convert to the VS/9 operating system Univac offers on its 90/60, Sauders said.

"This has given us a place to go without any change in software" should the college need a larger machine, Houser observed.

The 70/3 has a communications control module with 24 ports that serves about 20 on-campus and 10 off-campus terminals.

Most of these are either teletypewriters or Hazeltine CRTs, but there are also a substantial number of Digilog and Portacomm portable terminals, Houser said.

Millersville students run about 1,000 job/day during the school year, he said. "More than half of our 5,000-member student body has some interaction with the computer during its college years," he remarked.

The system also serves two local high schools equipped with teletypewriters.

With this time-sharing load, the Millersville staff feels it has to be careful not to let response times slip. To guard against this, the DP group wrote and installed a system activity profile (SAP) software monitor which runs continuously to track system performance.

"It gets such things as channel rate, swapping rate, paging rate and CPU utilization percentages from the different counters of the operating system," Houser explained.

The college verified the accuracy of its software monitor by attaching a Comress Dynaprobe to the 70/3 for a few months and measuring the same things, he said, adding the results turned out much the same.

Summagraphics Adds Dual-Tablet Digitizer

FAIRFIELD, Conn. – Summagraphics Corp. has announced a dual data tablet/digitizer system for digitizing graphics and entering alphanumeric, control and variable data, by utilizing a data tablet as a keyboard.

A 36 in. by 48 in. digitizer is used for supplying X-Y coordinate values for applications in cartography, interactive graphics, computer-aided-design, land analysis, architecture, space planning, medicine, etc.

The map, or plan, to be digitized is placed on the surface of the digitizer, and the data entered via either a stylus or cursor.

An 11 in. by 11 in. tablet, sharing the same controller as the larger tablet, is placed on the surface of the large tablet. This small mobile tablet can be oriented anywhere and used at will. With the same stylus, or cursor, the operator can move from the large tablet to the small tablet.

The Summagraphics dual system costs $5,200 from the frim at 35 Brentwood Ave., Box 781, 06430.

Frequency Changer Converts Foreign Power to Domestic

COVINA, Calif. – ALS Electronics Corp. has announced a solid-state, 50/60-Hz power frequency changer, the SMG-5-5.

The unit is designed to provide conversion from domestic to foreign or foreign to domestic power line standards for any application requiring a voltage and frequency stable power source such as tape and disk drives.

The SMG-5-5 operates at 92% nominal efficiency, a no-load idling loss of 2% of ratings and produces only a 62-db sound level, the vendor said.

The SMG-5-5 offers protection from overloads and short circuits, low output impedance and fast response, the vendor said. Any number of units may be paralleled to increase capacity or obtain redundancy and an uninterruptible power supply (UPS) option is available.

The SMG-5-5 costs $9,200 from the firm at 733 E. Edna Place, 91723.

Three Trends Creating Need for Power-Line Monitors

By David Fuhrman
Special to Computerworld

Power-line disturbances have become real headaches for DPers in the last few years, with few installations entirely free of the problem.

Three continuing trends explain the increasing attention paid to power-line disturbances and their consequences.

First, on-line applications such as time-sharing, data communications and industrial process controls have emerged as the fastest growing segments within the computer industry. The luxury of being able to reschedule processing runs on these systems simply does not exist.

Therefore, shutdowns and output errors caused by power glitches are completely unacceptable.

Secondly, as faster, more sophisticated solid-state circuitry is developed, CPU and peripheral equipment is becoming increasingly sensitive to high-speed transient impulses. Memories are particularly susceptible to spikes in the microsecond range.

Thus, manufacturers are requiring tighter and tighter specifications on the commercial power supplied to their machines.

The final important trend is the deterioration in quality of the commercial power in most regions. The expanding power distribution network leads to increased switching, the most common cause of high-frequency oscillatory disturbances.

Since the energy crisis, load-shedding and deliberate voltage reductions have become commonplace during periods of peak demand. These problems show no signs of letting up in the foreseeable future.

The combination of these three trends to more line-sensitive applications, more sensitive equipment design and deteriorating power quality results in the concern now being shown to powerline disturbances.

New-Generation Monitors

However, there is a new generation of power-monitoring equipment available to help designers and users cope with power-line disturbances. These are microprocessor-based instruments which interpret the raw power data and present it in a form suitable for immediate managerial action. The time at which each disturbance occurs is clearly indicated.

The monitors are small, portable and easy to install and operate. A major advantage these new monitors have over the older strip-chart types is their suitability for long-term unattended operation, since they only record when a disturbance exceeds preset limits.

The microprocessor-based power monitors are capable of recording and analyzing several types of power-line disturbances, any one of which, depending on its magnitude and duration, can cause a simple output error, a complete shutdown or even equipment damage.

Consequently, monitoring equipment is coming into wider use. For example, monitors make site surveys prior to installing DP or data communications equipment relatively simple.

The characteristics of power in each location are unique. By collecting statistical information on the number and magnitude of the various kinds of power glitches, a "power-line signature" can be composed. Very few installations require either no protection or a fully redundant uninterruptible power supply (UPS) system.

Typically, the most cost-effective solution lies somewhere between these two extremes. Regardless of the solution chosen, comprehensive power monitoring enables the user to anticipate problems of poor power quality before they induce costly equipment problems after installation.

Monitoring power on a permanent or a temporary basis in existing installations can also be highly effective in minimizing downtime. It enables the user to rapidly pinpoint the cause of output errors, shutdowns, lost information or damaged equipment.

Fuhrman is with Dranetz Engineering Laboratories, Inc.

Clustered data entry and concurrent processing with shared files...$677 a month.

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Shared file access.

The 440 system lets you share and access files locally, reducing investments in telephone communications and central CPU resources.

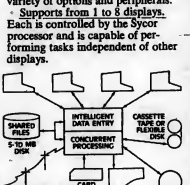
Data entry made easy. Now each operator, at her own display, can make use of current data in shared files to support data entry functions. For reduced keystrokes and lower error rates.

Inquiry/Response. File look-up is made simple with up-to-date information on-site, using the 440's own file management and disk storage capabilities.

System modularity.

Design your own system with a variety of options and peripherals.

Supports from 1 to 8 displays. Each is controlled by the Sycor processor and is capable of performing tasks independent of other displays.



Choice of 5 and 10mb disks. Store and retrieve programs, shared files, and data at remote locations.

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And to complete our system configuration, choose from matrix and line printers, computer-compatible tape drives, card readers, and a variety of communications options.

Compatibility.

There's full software compatibility with our Model 340 and 350 stand-alone terminals. Keyboards are also compatible.

Programming. One program fits three different systems—340, 350 and 440.

Communications. Communicate with the mainframe, emulating IBM 2770, 2780 or 3780 protocols. Or use the 440 as a polling station at your central computer site to receive and transmit data to remote 340s, 350s, and 440s.

Concurrent processing.

And best of all, while data entry is being performed in the foreground, you can be doing other jobs concurrently in the background. Jobs that can save you time and money. Jobs like:

Remote job entry. Use the 440 with its card reader and 300 LPM printer for large-scale remote job entry. And since the system contains a CRT and a keyboard, you don't pay extra for them.

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Lundy Check Stripper Repairs Micr Checks Rejected by Machine

GLEN HEAD, N.Y. – Lundy Electronics & Systems, Inc. has introduced an automated check stripper, the Lundy 400, for repairing rejected Micr documents.

The Lundy 400 can process 8,500 check/hour with minimum operator attention, the firm said.

The unit has the same automatic feeder and stripping mechanism used on the higher priced Lundy MAE and has automatic detection of seventy mutilated items which can jam reader/sorters.

Rejected Documents Loaded

In operation, rejected documents are loaded into the input hopper and the high-speed feeder moves each check to the stripping station, where the 5/8-in. Lundy strip is attached to the bottom of each document. The check is then lightly embossed with a patented process, ensuring even stacking of stripped documents when reentered on a high-speed reader/sorter.

The stripped documents are then delivered to a single output pocket. The Lundy strip can now be reencoded on any Micr encoder. The rehabilitated check is now ready to be processed as a high-speed item.

The Zip Code for Glen Head is 11545.

Stoddard Diskette Hardhole Eliminates Wear Problems

WESTLAKE, Calif. – The Diskette Hardhole is a product designed to eliminate the hole-wear problems of floppy disk media, according to its vendor, Stoddard Engineering.

The product also improves registration and minimizes particle contamination, the vendor said, adding it can be easily installed by operators.

Stoddard offers two $9.95 packages. One includes 20 Diskette Hardholes and a attachment tool. The other contains 50 Hardholes.

Delivery is immediate from the firm at 32131 Lindero Canyon, Suite 212, 91361.

Besides Order Processing

Firm's 'COP' Patrols Product Shortages, Sales Control

By V.H. Goodwin Jr.
Special to Computerworld

A centralized order-processing (COP) system at Exxon Chemical Co. U.S.A. has provided the expected benefits in improved customer service and more efficient operations but has also coped with recent product shortages and sales control procedures quickly, precisely and effectively.

Today our 25 sales service coordinators handle a variety of customer-related tasks on a real-time basis. For example, a coordinator can quickly determine a customer's up-to-the-minute situation with respect to open orders, shipped orders and sales controls.

This is all made possible by a real-time data base. COP operates on an IBM 370/165 and uses a 155 for backup. Data base updates and inquiries are managed by IBM's Information Management System (IMS) and initiated through 2260 CRT terminals, soon to be replaced with 3270s.

Our sales service sections are organized along product lines. Each coordinator is assigned to specific customers and has prompt access to order status and product inventories as well as the current sales control status, if any, for products and customers.

This information is especially useful when a customer urgently needs a product at a designated location. The coordinator is better able to provide accurate information on product availability and commit to a shipping date. Ordered quantities are charged against available inventories during the order entry process.

The on-line inventory system also provides timely information on available inventory, committed inventory and in-transit replenishment stocks. In addition, optimum supply point, package type and mode of shipment information are displayed on the system's terminals.

Customers are thus assured that ordered quantities are committed as soon as an order is entered into the system. The order is promptly printed on a hard-copy terminal at the supply point that will ship it. The computer also produces order acknowledgments that are mailed daily.

Transportation services for moving the products are provided by a centralized traffic group which arranges for carriers to meet the scheduled shipping dates.

This centralized processing capability helps speed orders on their way at a time when fast response is especially important. Of the more than 300 orders the company handles daily, about 25% must be shipped the same day, and another 30% must be shipped the following day.

Provides More Lead Time

COP – by expediting orders to a plant, warehouse or shipping terminal – improves our customer service capabilities by providing more lead time at supply points for planning and scheduling.

COP serves seven of the eight product line organizations of Exxon Chemical Co. U.S.A.

Historically, our order processing, transportation and other distribution-related functions for those product lines were highly decentralized. In 1967, a new distribution organization was established by Exxon and assigned corporate responsibilities for these activities – at a time when distribution costs were first recognized by many companies as their third largest cost.

Order processing initially remained decentralized and was handled by 19 local sales offices, but the organizational restructuring allowed plans to be drawn for eventual consolidation.

Order/Invoicing System

In 1967, a major project was also under way in Exxon's Mathematics, Computers and Systems Division. It was developing a computerized real-time order/invoicing system. This system was eventually designed to implement, in steps, on-line order entry, order printout, ship data input, inventory management and other critical tasks.

The batch invoicing program was initiated in 1969, on-line order entry in 1971 and inventory management in 1973. Invoicing – as well as the generation of order activity, inventory and control reports – is performed nightly.

Enhancements planned for the near future include computer-generated bills of lading, a freight rate data bank and an on-line rail car inquiry capability.

Justification for our on-line system results primarily from manpower savings and improved cash flow due to faster and more accurate invoicing.

Daily summary reports provide sales service coordinators, marketing and management as well as our customers with timely and accurate information on the status of all order activities. Previously, such information was available only by laborious manual effort, but never as timely or complete as required.

In 1972, it became increasingly apparent that the on-line system provided us with ample resources to further optimize our order-processing organization and procedures. We had a network of 18 sales offices which serviced local customers and forwarded all orders to a central order center in Houston.

In early 1973, a 60-day pilot program was initiated in which northeastern customers placed their orders directly, through a toll-free number, with our Houston center.

Some coordinators in northeastern offices were temporarily moved to Houston and continued handling their accounts through the new system.

By mid-year, the pilot program was judged successful, and management approved the move to COP. We implemented it over six months.

COP successfully met many challenges during 1974, including product shortages, transportation equipment shortages, truck strikes and weather problems. It proved to be adaptable, efficient and extremely reliable in a rapidly changing environment.

Goodwin is distribution operations manager with Exxon.

Mini Bits

Pushpa Core Gives 64K With 240 Nsec Access Time

WESTMINSTER, Calif. – Pushpa Memories has entered the minicomputer add-on memory market with 64K-byte add-on card memories for Interdata's 74, 7/16, 7/32 and 8/32, Data General's Nova series and Digital Computer Control's D-116 series of minicomputers.

Pushpa said these core memory units have a 240 nsec access time and 650 nsec cycle time. However, the firm noted, the memory interface has been designed to automatically match and adjust its timing specifications to that of the computer.

Pushpa said it plans to sell its memory cards for approximately the same price charged for its 32K-byte memory.

The firm is at 14142 Ipswich St., 92683.

MDS/11 Develops PDP-11 Software

HARTFORD, Wis. – The Micro Data System (MDS/11) from General Robotics Corp. (GRC) uses a Digital Equipment Corp. PDP-11/03 CPU which gives the unit the capability to develop software packages for other PDP-11 systems, the firm said.

In addition to the central processor, a single-drive, IBM-compatible floppy disk unit is included in the basic MDS/11 configuration. The controller can be expanded to accommodate up to four drives for a total of over 1M bytes of on-line storage.

Also included in the package is a 24-line, 80-column, 9,600 bit/sec CRT terminal.

A basic system includes an 8K-word CPU, single DMA-controlled IBM-compatible floppy disk and GRC's own PDRT-11 operating system.

This configuration is priced at $8,265, GRC said from 57 N. Main St., 53027.

1,024K Prom Fits PDP-11

TROY, Mich. – System Associates has 1,024K-word programmable read-only memory (Prom) for the Digital Equipment Co. PDP-11.

The Prom is contained on one quad-size PDP-11 module. The memory can be located at the appropriate Unibus address by jumpers on the module. Proms are available from 256K to 1,024K words.

Each memory chip (Intel 1702A or equivalent) is programmed off-line on a separate device. The user can reprogram the unit as desired.

The 1,024K-word Prom is priced at $750 with delivery in 60 days. Prom programming of user-supplied programs is available upon demand.

System Associates is at 55 Park St., 48084.

Diva Cuts Disk Prices

EATONTOWN, N.J. – Diva, Inc. has reduced prices up to $1,300 on its line of large-capacity and floppy disk systems.

The DD-25, a 127.4M-byte capacity, dual-spindle drive which includes a DOS I/O driver on paper tape or 800 bit/in., 9-track magnetic tape, is now priced at $28,500.

The DD-23, a 63.7M-byte, single-spindle drive, has been reduced to $17,990.

The DD-14/2, a 63.7M-byte, dual-spindle drive, is priced at $22,900 and the DD-14, a 31.8M-byte, single-spindle drive, is now $12,600.

Diva's DF-100 floppy disk controller is now being offered at $2,095.

The floppy disk systems, DF-101, DF-102, DF-103 and DF-104, have been reduced to $2,995, $3,750, $5,300 and $6,995 respectively.

Turnkeys Also Touted

Minis Tolling Death Knell for Big CPUs?

By Patrick Ward
Of the CW Staff

BOSTON – Does distributed processing spell the end for large central mainframes and the people who run them?

Can minicomputers really take over the small businessman's clerical burdens with the turn of a key?

Two panelists at a session on minicomputers at a recent Data Processing Management Association regional conference here tended to answer these questions affirmatively, but their audience was laced with skeptics.

One of the panelists said he first realized the capabilities of minicomputers when he worked for a company with a central CPU and five remote branches.

"The central mainframe wasn't up to handling the job, so the company moved minis to the branches. Before long, there was hardly anything left for the large machine to do," according to Martin F. McDonough, now president of Value Data Processing.

"Instead of having a large 370 running in four or five partitions, one way of the future might be to distribute that power to the user departments," added Ardyn E. Dubnow, DP chief at Northrop Corp.'s Electronics Division.

The user departments "could do 90% of the editing there and then batch the data to the host" or, alternatively, do 100% of the editing there and keep their data on-site, he said.

Physical, Functional Types

There are both physical and functional types of distributed processing, Dubnow explained. Physically distributed computers could mean the arrangement of five or six minicomputers in a ring formation.

Each mini would have its own data base, but could communicate with the other minis, he said.

User departments would keep their files on prime interest on one particular machine. Each department could retrieve data from others' machines to do their own processing, but could not change the data on another user department's prime files.

In the functional variety of distributed processing, an intelligent terminal or minicomputer would maintain its own unique files, while a host CPU would keep a data base of common files.

Key entry and editing would go on at the distributed sites and serve to update the central data base, Dubnow explained.

But members of the audience had some points to make, too.

"If you're talking about a worthwhile ring formation, you have to put a lot of controls on it to manage it all," one attendee said.

"Therefore your costs begin to come up to those of a typical host computer," he said.

"Local-level distributed processing is primarily a data entry function, but your host costs may go up if you have to add further controls and hierarchical software," another attendee pointed out.

"There can be a trade-off in costs," he added.

Distributed processing can also mean "compensating for varying levels of competence in different departments," a third attendee said.

While he said he can understand how departmental managers might want their own computing operation, "four managers means four stand-alone systems run with varying levels of checks, balances and other quality controls," he said.

"If you want your organization to be a football team, do you want to have four quarterbacks?" the attendee asked.

While "breaking off elements from a hard-to-control DP site is the wave of the future, someone has to have unified control over the organization," he stressed.

The question of whether the DP group should be an independent authority responsible for all the data that passes through a company or whether DP should be just an appendage of the finance department was at issue here.

Both of the latter attendees felt a DP group should have an overall responsibility for the DP-generated data their corporations use.

First-Time Users

How easily can minicomputers fit into the operations of first-time user? This question came up as McDonough described how his company has turnkey systems installed and doing productive work in six weeks to 90 days.

There are typically two to five CRTs brought in for on-line entry, no card equipment and maybe two or three matrix printers, McDonough said.

The turnkey systems use mostly prewritten software that covers, among other applications, on-line order entry and accounts receivable processing – "the complete business package," he said.

"But I don't believe it's possible to train people in that time," a questioner said from the floor. "Doesn't ordering forms from the printer take at least that long?"

"How long does it take to install a copier or adding machine?" McDonough parried. These minicomputer business systems provide the same kind of utility function, he said.

People shouldn't interpret turnkey minicomputers as "a simplistic answer," one attendee commented. Company A may have different procedures than company B because it's in a different industry, he said.

While he agreed precoded software packages have been successful in some cases, the user questioned whether they were the answer for most shops.

But "payables are payables are payables," Dubnow concluded.

Bendix Picks Two Minis To Collect, Relay Test Data

KANSAS CITY, Mo. – The Kansas City Division of the Bendix Corp. here uses two minicomputers for the collection, editing and analysis of data generated during production of hybrid microcircuit assemblies.

One of the minis – functioning as a satellite minicomputer in a manufacturing area – receives and checks data from product-testing stations, reformats the information, updates short-term quality history files and passes the test results to the second unit.

The second machine, a remote front-end processor, uses Hasp/RJE-type software to transmit accumulated data through a Hasp link to an IBM 360/65.

Bendix uses these Varian V73 computers now to collect test data from three types of hybrid devices. The minicomputer network eventually will be expanded through the addition of satellite systems – to serve other manufacturing operations within the Bendix plant, according to Michael Rimmer, a senior control systems analyst with the division.

Direct to Satellite

In Bendix's setup, data from computerized test stations move directly to the satellite from the testing equipment. Results from manual tests are entered by operators through CRT terminals.

When it receives the data from a manual station, the satellite V73 determines whether the information was entered properly and whether the data values fall within acceptable limits for the parameter measured.

If so, it accepts the data; if not, it queries the operator for correction or confirmation. Out-of-limits data are accepted only when the operator confirms them.

The V73 then reformats the data and uses the reformatted information to build short-term history files that show test results for the 50 devices most recently tested.

These files are especially valuable to the division's quality-control engineers during the startup or modification of a manufacturing process.

Guide to Tests

The satellite V73 also retains a guide

(Continued on Page 32)

EDS Gives Nova Four-Port Board

IRVINE, Calif. – A lower price model of the EDS-8 data channel multiplexer has been introduced by Educational Data Systems (EDS).

The new four-port data channel multiplexer board, the Model 300-A4, plugs into one slot of any Data General Nova-type computer.

This board handles four serial asynchronous devices operating independently at RS-232C levels in half- or full-duplex mode. Data rates are program-selectable up to 9,600 bit/sec.

All I/O control functions are performed in hardware, but data rate and character size are under program control for each port, the firm said.

The Model 300-A4 features automatic buffer mode for input or output of entire character strings without program interruption. The size and location in core of each I/O buffer is under program control.

The automatic buffer mode uses the data channel to minimize computer overhead and allows recognition of special characters requiring interrupt. Automatic echo with no additional computer overhead is under program control, EDS noted.

Device control and status lines allow control of peripheral equipment locally as well as through modems for remote peripherals. For a full-duplex Bell 103-type data set, the device control line is used as the data terminal ready signal and the status line is used for the carrier detector signal.

The Model 300-A4 operates in either current loop or RS-232C mode.

Device connection to the Model 300-A4 is direct to the board and requires no modification to computer wiring.

The Model 300-A4 is priced at $1,600 from EDS at 17981 Sky Park Circle, 92707.

Shouldn't Be 'Faceless Mass'

Managers of Small DP Shops Must Demand Recognition

By Toni Wiseman
Of the CW Staff

BOSTON – Having an IBM System/3 is not a disease, although larger users' reactions might lead one to believe it is akin to leprosy, attendees at a recent regional Data Processing Management Association (DPMA) conference here were told.

It is time small- and medium-scale users stopped being the faceless mass, Al DelGardo, DP manager at Ward-Johnson, Inc. told attendees.

"You are responsible for being a small, nonvocal minority, but in reality you are a majority," Delgardo said, adding the reason small users have not been better represented at association conferences and other professional meetings is they have never demanded recognition.

DP Managers' Problems

Small- and medium-scale DP managers face the same problems as large-scale managers and often some, because they are more visible, interacting with senior management probably daily, he said. In a larger organization there is a longer chain of command.

"In the area of small- and medium-scale computer installations, DP managers tend to view their career and job opportunities in very negative terms," DelGardo said. "Firing and job changes are common."

"This is pretty much due to indifference to developing management skills in this area," he said.

Senior management's tendency to treat the DP manager in this area as a scapegoat when anything goes wrong is also common, due to the vendor's habit of overselling the hardware's capability and underselling the people, he said.

All too often, senior management judges the DP manager on the amount of paper which comes out of his area, he said. Management must be educated so it knows what the computer resources are.

Decision Already Made

In many companies, the decision to purchase the small- or medium-scale computer was made before the DP manager was hired, DelGardo said. By the time the manager comes in, the vendor has already sold senior management on which systems should and can go up.

The DP manager starts the design of those systems, but, meanwhile, the resource is just sitting there so he has to put up some programs for quick payback, he said.

What this all boils down to is that when it is time to put the "major" system up, the DP manager finds he has run out of disk and needs an additional programmer or other resources.

This is when management says the vendor estimated the shop should run on $200,000/year, not $400,000/year, and that DP manager gets fired, DelGardo said.

Then a new manager comes in, cuts a programmer or some equipment to save money, and pretty soon he's in serious trouble operating the shop and gets fired, he continued.

"A consultant is sometimes called in at the last minute to share the blame," DelGardo said. "And he charges the company thousands of dollars to tell senior management the same thing you've been telling them all along."

"You can show management what areas are being effectively served and which are not, but the question to be answered is why the DP department was formed. Was it for more efficient operations or for new operations?" Senior management has to answer this question," DelGardo said.

The DP manager must be an agent of change, DelGardo said; he has to develop managerial skills and learn to play the games of politics and management.

"Business is a game; management is a game. There are rules; know when to bluff, when to call a bluff and when to pull in your horns," he advised.

Finally, DelGardo stressed the necessity for managers to insist they be treated as management, as an executive and not as a technician.

Two Minis Collect, Relay Data From Product-Testing Stations

(Continued from Page 31)

that describes the tests to be performed at each manual station and the data the test operator must enter through his CRT terminal. Any operator can consult the guide by requesting a CRT display of its text.

Developed as Manual

The guide was developed initially as a printed manual, and the operators then recorded their data on printed forms. By converting the guide and the data forms to computer records, Bendix engineers eliminated not only paperwork, but also the paper itself.

After reformatting the test data and updating its history files, the satellite V73 passes all of the data to the second V73 – the front-end processor.

This machine uses Varian's Hasp/RJE software to emulate an IBM 360/20 remote job entry unit.

The front-end processor accumulates information from the satellite and, at intervals of 15 to 30 minutes, incorporates it into a jobstream that moves through a Hasp link to the 360/65.

This information includes test data from automated testing stations; test data from manual stations; updates to the inspection guide master file; record-of-assembly information, which includes the serial number of each finished assembly and the serial numbers of the individual components; and quality-attribute information – the number of units sampled out of each lot, for example, and the failure rate among devices sampled.

Exception Report

When it receives the test results transmitted by the front-end processor, the IBM 360/65 checks them and incorporates out-of-limit values into a daily exceptions report for Bendix's production engineers.

All of the test results are placed into an on-line data base which can be consulted through remote terminals.

Hello, IBM.

ADDS introduces the first truly low cost CRT terminal for the IBM user.

We've been waiting a long time to say this:

Hello, IBM!

There, we finally said it.

You see, IBM (we almost feel like we should call you "sir") Applied Digital Data Systems (that's us) now has a terminal for IBM users. Wait'll you see it.

It's called the 980A. And, it's packed with the features that helped ADDS carve a reputation in the Teletype® compatible market. Sharp, readable screen with upper and lower case character display. Line as well as character insert/delete. Not to mention blinking, formatting, and patented graphics.

Compatibility?

The 980A looks just like a 3270 to the telecommunications access method (BTAM, TCAM, etc.) and to such real time monitors as CICS. It can even operate on the same phone line as 3270's.

However, since your 3270's don't have blinking, lower case, graphics (or most other special 980A features, we might add), applications software developed to support the 3270 won't support our 980A. So we don't think we'll be replacing many of your 3270's.

But, the IBM user can develop new applications around the 980A. And the reason we think he should (here's where you get nervous again) is quite simple. The 980A offers unmatched features at an extremely low cost. Namely, $3200.00 to purchase, $90.00* a month to lease.

And all of our units are serviced by NCR.

That's pretty much why we think if our shoe fits, the IBM user's going to wear it.

Because even though you're very, very good, IBM, there's always room for a little improvement.

Sir.

Hello, ADDS.

I may have a new application for your 980A. Please send additional information.

Name _____

Company _____

Address _____

_____ Zip _____

Applied Digital Data Systems Inc.
100 Marcus Boulevard
Hauppauge, N.Y. 11787 **ADDS**

*3 year lease-purchase [illegible]

Versatec Output System Prints Hard Copy From Minis and CRTs

SANTA CLARA, Calif. – A hard-copy output system from Versatec produces printout and graphics on-line from a computer and, on command, hard copy direct from a CRT.

A complete output package, the system includes any of four standard Versatec printer/plotters, associated controllers for specific computers and CRTs and Versaplot plotting software, the firm said.

Through triplexing, one printer/plotter serves three output functions by replacing line printer, pen plotter and dedicated CRT hard-copy device. The system will print up to 1,000 132-column line/min, plot graphics on-line at up to 2.4 in./sec and, on command, produce permanent hard copy from up to four CRT displays, the firm said.

The system prints and plots simultaneously under machine control without changing hardware. When hard copy is requested from a CRT, the system prints the desired copies, then returns to computer-directed work. Various priority protocols allow the user to preselect the switching configuration. At user option, the switch from computer work to CRT can take place at the end of line, page or transmission, the firm said.

When switched to the CRT copy function, copy is printed within 10 to 20 sec. After the copy is printed, the system automatically returns to computer-directed work, the firm explained.

Electrostatic Writing

Dual array electrostatic writing produces high contrast graphics with enhanced detail, Versatec said. Resolution of up to 200 dot/in. is available, the mean time between failure is rated in excess of 3,000 hours and operation is virtually silent, the vendor added.

Four printer/plotter models offer a range of 500 to 1,000 line/min print speed (asynchronous); .45 to 2.4 in./sec plot speed (asynchronous); 11- or 20 in. paper width; a 64 to 128 Ascii character set; and 132 to 180 columns.

Options include simultaneous printing and plotting, dual buffers and larger character sets.

Controllers are available for 30 popular minicomputer and computer models, Tektronix display terminals and other CRT units.

Versatec CRT controllers range in price from $950 to $1,750. Total output system packages (printer/plotter, computer and CRT controllers and plotting software) are priced from $9,925.

The firm is at 2805 Bowers Avenue, 95051.

Decus Sets Fall Meeting

MAYNARD, Mass. – A discussion of federal legislation protecting privacy and its impact on computer users will be a special feature of the fall meeting of the Digital Equipment Computer Users Society (Decus).

The meeting will take place in the Los Angeles Hilton Hotel Dec. 2-5.

The keynote speaker will be Keith Uncapher, director of the University of Southern California Information Sciences Institute at Marina Del Rey, who will speak on "Computers, Computing and Communication – 1980 Style."

The user group can be reached through DEC, here at 01754.

System Studies Speech Problems For More Efficient Correction

By Ann Dooley
Of the CW Staff

ITHACA, N.Y. – Correcting children's speech problems has always been slow and frustrating, but now, with the help of computer speech analysis, the process may be made quicker and more efficient.

Kal Telage of the Ithaca College Department of Speech Pathology and Audiology has designed a method of analyzing the key features common to an individual's speech errors. "Simply because speech happens so quickly, you can't observe the process; you can only perceive the problem," Telage said.

"The computers can hold information that would be impossible for the individual to remember," Telage said. "Some sounds involve a half dozen or more features, and the computer can put these bits and pieces together and identify a pattern which may relate to many sounds a child cannot correctly say."

Speech pathologists are able to describe individual sounds by their physiological features or the movements which make up each sound. Since each sound includes a variety of features, the computer is used to identify the problem features by ordering and identifying them.

The child is tested to identify individual trouble sounds which become the target for further testing. Then the computer is used to analyze the information in terms of two types of problems: features that are missing and features that are being used inappropriately.

From this, certain features are identified and how they are contributing to individual sound error is studied. A few key features of speech may be causing the child to misarticulate many sounds.

In the past, speech pathologists have worked on such sounds individually, but with the computer a number of sounds can be improved by concentrating on the key features involved.

"With this information, we have knowledge of what the child is failing to do or is doing incorrectly, and this will let us develop a more individualized program," Telage said.

File Lists Lovelorn Zoo Animals

ST. PAUL, Minn. – A zoo in Kansas City, Mo., needed a mate for its marmoset but couldn't find one; a zoo in Washington, D.C., had an extra one but didn't know Kansas City wanted one.

The two Brazilian monkeys might have gone unmatched had they not been listed in a computerized file of zoo animals kept by the Minnesota Zoological Garden here.

The nose count lists about 50,000 mammals, representing 850 species living in North American zoos, and is a product of the International Species Inventory System (Isis), sponsored by the American Association of Zoological Parks and Aquariums.

In addition to allowing relatively easy matching, the list enables animal conservationists to determine how many animals classified as endangered species – such as the gray wolf, Siberian tiger and Indian rhinoceros – are in captivity.

Officials in participating zoos fill out one form per animal, listing its scientific name; common name; date of birth; parents; and, in case of death, its cause.

The data is processed on the state's IBM System 370/158 in St. Paul.

"The system enables us to generate a 'profile' of each animal, to pinpoint unwanted genetic defects and to prevent an animal with a defect from mating and transmitting it to the next generation," a zoo official said.

Zoo officials predict Isis will help them learn how long certain breeds will live in captivity.

Changes in DP Field To Radically Alter Conduct of Banking

NEW YORK – Within the next five years the conduct of international banking will be radically altered as a result of changes in computerized information technology, a meeting of bankers was told here recently.

Also, banks in virtually any country will be able to instantly analyze worldwide financial and economic developments through international on-line computer networks, according to John D. LaMothe, manager of product development for Interactive Data Corp.

While banks in the U.S. have been highly sophisticated users of computers, the technology and economics for international information networks have just recently begun to emerge, he said.

Major factors which will make worldwide data communications networks possible are lower cost computers, satellites and simplified computer applications languages, LaMothe said.

DP Determines Best Time For Use of Insecticides

MOSCOW, Idaho – Not Raid but computers are out to control the population of harmful insects, according to researchers at the University of Idaho College of Agriculture and the U.S. Department of Agriculture.

Insecticides must be applied at exactly the right time for maximum effectiveness, according to Donald E. Scott and George Butler, entomology researchers.

Typical insecticide treatment kills 98% of the larva and only about 65% of the adults so it was important to discover when their larval stage occurs.

Using a complex thermodynamic model, the researchers found higher temperatures promote growth at the larva stage.

Computers were then used to predict the summertime growth of corn earworm numbers in conjunction with the variation in temperature to determine the best time to apply the insecticides.

The entomologists conducted research into the earworm growth and found the insect larva population peaks in August after eggs hatch in July.

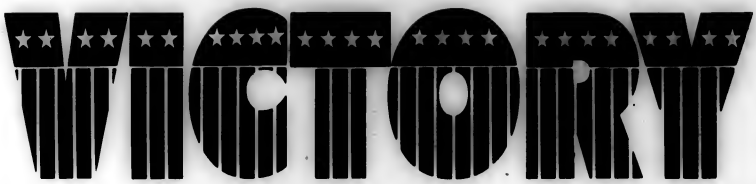
NCC '76 Student Fair Soliciting Projects

MONTVALE, N.J. – The 1976 NCC Student Computer Fair will be held during the 1976 National Computer Conference which will take place on June 7-10 in New York City.

Elementary, middle and high school students are eligible to enter projects in the fair. The deadline for submittal of application forms is April 1.

"We want students to concentrate on the social situations they know best. We'd like students to create new computer tools for home or school use, produce a work of computer art or design and implement a computer game," according to Dr. Sema Marks, director of academic computing at the City University of New York and chairman of the fair.

Marks can be reached at City University of New York, 33 West 42nd St., New York, N.Y. 10036.



SyncSort wins all the gold medals in the "Great Sorting Olympics!"

(Better luck next Olympiad, IBM.)

Call (201) 947-8500

Find out
how to sort
for less.

Which sort on the market today is really best? Which one uses the *least* amount of system resources to do a sorting job?

We found out by running a series of extensive—and expensive—tests we call the "Great Sorting Olympics."

In planning Sorting Olympiad I, we set two goals:

1. Unmask some of the misconceptions and myths that surround sorting.
2. Measure the exact amount of CPU Time, I/O Activity, and Elapsed Time that every sort on the market consumes.

First, we gathered the leading competitors from the Wide World of Sorts—our own SyncSort III-and-a-half, IBM's PEER/ICEMAN (SMI-5740), their older sort (SMI-5734), and a fourth contender from a minor sorting power.

Next, we asked three computer installations in the East, Midwest and West to provide the "tracks." They were to choose the files to be run and make the evaluation of the results. No hanky-panky. At one center, all four sorts were put through their paces under exactly the same conditions. At the other two places, SyncSort was matched against the IBM sorts.

Finally, we did something that's never been done before on the playing fields of sorting. We brought in a hardware monitor to judge the events.

SMF analysis wasn't good enough. It doesn't tell you what's really happening in a sort and it helps spawn those myths we referred to above.

By the time the dust settled, Whitlow's anthem had been played three times and SyncSort III-and-a-half had walked off with Gold Medals for:

- Least TRUE CPU TIME. SyncSort used 31.8% less than the average of the other three sorts.
- Least I/O Activity. SyncSort used 32.2% less than the average.
- Least Elapsed Time. SyncSort used 33% less than the average.

Proud? Sure. But not exactly surprised. We knew we had the best sort all along. But what did surprise us was how much new information we discovered about how other sorts really operate.

We discovered, for example, that other sorts use *twice* as much CPU time in the supervisor state as they do in the problem state. If one of our competitors tries to sell you a sort package, be sure to ask him if he's measured that aspect of his sort with a hardware monitor.

Or ask him if it's true that you can reduce channel time or device busy time by reducing EXCP's. He may not be aware that that's one of those sorting myths.

Why not call us today? We wouldn't want you to be misled because you didn't have the latest facts on sorting.

OVERSEAS REPRESENTATIVES —

London, Paris, Dusseldorf, Brussels — (Gemini Computer Systems), Rijswijk (ZH) — (PANDATA), Madrid — (Entel/Ibermatica), Vienna — (Ratio), Sao Paulo — (Deltacom Do Brasil), Melbourne — (The Shell Company of Australia, Limited),

WHITLOW COMPUTER SYSTEMS Inc. 222 S. Marginal Road, Fort Lee, New Jersey 07024

COMPUTER INDUSTRY

CI Notes

Memorex, Others Ordered To Pay $4 Million in Suit

SANTA CLARA, Calif. – Plaintiffs in the suit against Memorex Corp. and a number of other defendants which alleged violations of federal securities laws and regulations in 1970 and 1971 will receive an aggregate payment of $4 million.

Under the ruling made in the U.S. District Court for the Northern District of California, Memorex will pay $1 million in cash and notes toward this amount.

While neither Memorex nor any of the other defendants admitted any liability in connection with the suits or their settlement, the company said it wants to dispose of the burdensome litigation.

ICL Buying Into NCR/CDC Firm

DAYTON, Ohio – NCR Corp. and Control Data Corp. have signed an agreement with International Computers Ltd. (ICL), Britain's major computer manufacturer, which allows the Britons to eventually acquire one-third of the shares in Computer Peripherals, Inc. (CPI).

ICL initially will purchase a one-sixth interest in CPI for about $8.6 million.

CPI presently supplies both CDC and NCR with all their card, tape and printer equipment.

Marshall Gets $800,000 in IBM Suit

LOS ANGELES – Marshall Industries has been awarded $800,000 as part of the settlement of an antitrust suit filed against IBM in December 1973.

The El Monte, Calif., distributor of electronic components filed suit in the U.S. District Court, Central District of California, here.

Under terms of the settlement, IBM will pay the cash settlement and both must drop all other claims.

Xerox Counters IVC Suit

SAN JOSE, Calif. – Xerox Corp. has filed a counterclaim against International Video Corp. (IVC) seeking $150,000, which includes interest and $102,000 in alleged amounts due for services rendered.

The Xerox action charged IVC failed "to monitor the output from the Interactive Accounting System to insure correctness; failed to develop, install and maintain proper internal work flows, audit procdures and control points; failed to provided proper staffing for installation, development and operation of the Interactive Accounting System; and failed to use the Interactive Accounting System in an efficient and proper manner."

Aided by Super Minis

Mini Market to Hit $3 Billion by 1978

By Molly Upton
Of the CW Staff

SAN FRANCISCO – The minicomputer market, bolstered by a tripling of the super mini market, will quote about $3 billion by 1978, according to Richard W. Anderson, general manager of Hewlett-Packard Co.'s (HP) Data Systems Division.

Within the next 1,000 days, other key changes in the industry will occur in the areas of LSI microprocessors and low-cost personalized systems, he told financial analysts at a conference here recently.

The mini market will grow about 30% annually through 1978, Anderson said. The market for super minis in 1975 will probably double that of 1974 for a value of around $250 million; it now accounts for about 20% of the mini market, he added.

Anderson classified as super minis such machines as Digital Equipment Corp.'s PDP-11/70, Data General's Eclipse, the HP 3000 and Interdata's 8/32.

In line with the increase in the super mini market, the industry is currently undergoing a shift in favor of end-user equipment, which now holds the edge over OEM in both dollars and unit shipments, he said.

The OEM market previously accounted for about two-thirds of industry unit shipments, he said.

25% Mini Growth

Viewing the present, he said 1975 industry mini shipments should reach between $1.4 billion and $1.5 billion and represent a growth of about 25% over 1974.

In past years, the industry has grown by about 30%, he observed.

Profits within the industry should be reasonably consistent with those of the past – about 10% after taxes for the leaders. However, some of the smaller firms will have a worse year, and there will be a shift in market share, he predicted.

The price decline throughout the industry will continue to range between 25% and 30% a year, he added.

For the future, microprocessors and microcomputers "are going to continue to amaze us" with more and more circuitry on a chip. Performance will improve as silicon-on-sapphire chips and LSI come into use.

In addition, Anderson said he sees in the future excellent micros and minis based on micros in the CPU as well as in the controller and I/O devices.

This move will be accompanied by "substantial improvement in software and software development" for micros and "a great deal of progress in micro-based terminals and peripherals," he forecast.

Key technological changes will include increased use of 4K random-access memories (RAM) as well as the debut of the 16K RAM. Along with advances in memory technology will come architectural improvements.

"We will see some really handsome improvements in peripheral price/performance," Anderson said. Already the price of disk memory is improving, he observed.

Muddy Definition

Anderson admitted the definition of the low-cost personalized computer system is muddy, but agreed it is a complete system aimed at the non-DP professional.

It is integrated, with components packaged together rather than racked to reduce price. Personal computers also offer a "more friendly user interface" with self-instructing software.

These systems will have to have good applications packages but, more importantly, "good application examples" so the user can identify his need for such a

(Continued on Page 38)

IBM's Voluntary Transfer Plan Aimed at Beefing Up Branches

By Nancy French
Of the CW Staff

WHITE PLAINS, N.Y. – In an effort to reduce headquarters' overhead for its DP division and beef up its branches, IBM is emphasizing its "standing policy" of encouraging employees to voluntarily transfer to new IBM jobs.

Although the program is expected to extend into 1977, reassignments have started already and most of the moves will occur during 1976, a company spokesman said.

Some individuals who now hold staff responsibilities will be encouraged to accept line responsibilities and even sales jobs in the field.

Others will be encouraged to accept positions in "marketing support and market planning." However, none of these positions will be domotions.

The transfers are expected to reduce the number of employees assigned to headquarters' responsibilities here as well as at the company's regional offices in New York, Chicago and Los Angeles.

Since the transfer program is strictly voluntary, the spokesman said he "could not say" how many employees would be involved ultimately.

IBM has a full-employment "tradition" – it hasn't had a layoff "as long as I can remember," the spokesman said.

With such a "tradition," it is conceivable people will move from positions where they are contributing little to the company's earnings to positions where they could help bring in new business, he explained.

Workload rebalancing is also going on in several of the firm's manufacturing plants

IBM's production-line workers are also eligible for the firm's voluntary transfer program, he said.

Sanders Wants His Name Back

NASHUA, N.H. – The founder of Sanders Associates, Inc. has asked shareholders to remove his name from the title of the company and get rid of all current directors more than 64 years old. Royden C. Sanders Jr. submitted these proposals in proxy statements, prepared for the annual meeting Oct. 25, in which he said he has "no confidence" in the company's present management.

Sanders resigned Feb. 28 and was succeeded by Harold W. Pope, who still heads the firm.

Although a company spokesman said Sanders resigned for "personal reasons," sources attributed his departure to dissatisfaction with the firm's performance expressed by stockholders and lender banks.

Objecting to the board's "domination by older people and the company's own employees," Sanders suggested all persons over 64 be disqualified from serving on the board of directors and that shareholders limit to two the number of employees permitted to serve on the firm's 13-member board.

As for use of his name, Sanders said further use would "cause irreparable damage to my professional and personal reputation."

The board contended Sanders has formed a new company named Sanders Technology Systems, Inc. and therefore has "a potential economic interest" in asking Sanders Associates to change its name.

PTS-1200 Release Called Example of RDS Philosophy

By Molly Upton
Of the CW Staff

WALTHAM, Mass. – Raytheon Data Systems' (RDS) recently released PTS-1200 is an example of the firm's philosophy of selectively building a customer base and then adding hardware and capability to that base, according to Joe Hitt, vice-president of marketing.

The system [CW, Sept. 24], which can be installed on a field upgrade, gives the firm a product that can replace a variety of equipment now found installed at the remote sites of large businesses, Gary Sharpe, product manager, said.

No other firm seems to be addressing the handling of such tasks as data entry off-line within a branch as well as access to central files, Sharpe said, describing the system as more akin to an on-line rather than a time-sharing system.

RDS will market the unit to the central DP sites of its existing base of over 12,000 IBM 3270-type terminals in airlines, insurance, manufacturing and distribution, and banking and credit authorization markets, as well as utilities market, Hitt said. These users will assemble the software and distribute the systems to their branch locations, he explained.

CW Photos by M. Upton

Hitt Sharpe

By providing macros, RDS provides the user with 90% of his needed applications, Hitt said.

The macros are in extremely high-level language with flexibility designed to make the user as self-sufficient as possible, which is in the interest of both the user and RDS, Sharpe added.

Also included with the PTS-1200 is a comprehensive set of programming debugging aids and utilities, he said.

In designing the system, RDS did not set out to adapt the mainframe language to a small machine, he observed, but rather to orient the language toward handling data in a display-oriented environment.

Reflects Quiet Image

In line with Raytheon's admittedly quiet image, the system has been operational for about a year and one-half and 16 units are installed at customer sites.

"One of the differences between profit and loss is the cost of field support," Hitt said, and RDS wanted to ensure documentation and utilities were complete.

In the last two years, RDS, a division of the Raytheon Corp., has been busy establishing its presence in the field and now feels it has a significant customer base upon which to build, Hitt said.

Business has tripled within the last three years and, at the end of last year, the firm was at the $50 million level, he said.

RDS increased its market penetration from 10 to 52 airlines with its reservation and departure control systems and has expanded into its targeted areas within Fortune 500 firms to such an extent that airlines no longer provide the majority of RDS business, Hitt said.

RDS was created in 1971 with the consolidation of Raytheon's terminals, minicomputers and microwave transmission systems.

Terminal Shipments in Majority

RDS currently ships over 1,000 unit/month and about three-quarters of the shipments are the PTS-100 terminal systems.

The division is profitable, Hitt said. Raython Corp. obtains 45% of its business from the military, and RDS is the only commercial division with the Raytheon name, he observed.

As an example of corporate support, the parent firm regards lease financing as an investment, he said.

RDS has a built-in marketer in Europe with Raytheon Europe and also maintains an office in Amsterdam that specializes in marketing to airlines and those needing seismic systems, Hitt said.

The Japanese distributor is Nissho Iwai and there are plans for marketing in South America as well, he said.

Mini Market Seen At $3 Billion in '78

(Continued from Page 37)

package, even if it needs some tailoring, he said.

IBM, he said, is going to be in the mini market and make its presence felt, thereby adding credibility, especially for the super minis, he said.

Anderson predicted one or two semiconductor houses will enter the systems market, and possibly one or two mini makers will integrate backward into the semi market. There will be more mini OEM business going to the micros.

The computer industry should not introduce many products incorporating new technology so quickly that it "leaves the 'i's undotted and the 't's uncrossed," he said.

Although these new improvements are helping to reduce manufacturing costs, the mini maker must beware not to pass on price reductions to the user without considering support costs, which he indicated will be higher as the need for user instruction increases.

Anderson chided the DP industry and said it must do a better job of selling itself to schools at all levels. He sees a shortage of well-trained, creative technical talent as one of the major problems over the next 1,000 days, he said.

In such a dynamic industry, mini makers "cannot sit back and let fortunes ebb with the economy; they have got to make products useful to the market.

"We should not run too lean on engineering talent," he warned.

Not only does he see a shortage of engineering talent, but also of service and customer representatives, he said.

Previously the industry tended to rely on the U.S. armed forces to train people, but this source is drying up with the advent of the volunteer army, he observed.

Adapso Survey Reports

Service Firm Revenues Up 24% in '74

MONTVALE, N.J. – The average revenues and profits of DP service companies increased by 24% and 9% respectively in 1974 compared with those of the year before, according to the Association of Data Processing Service Organizations' (Adapso) ninth annual industry survey.

Prepared for Adapso by Quantum Science Corp., the survey noted a continuing growth pattern by all segments of the industry during the next five years.

The preliminary report, consisting of 128 responding service companies, did not include a dollar forecast for facility management companies.

The report suggested, however, that government-related facility management contracts may continue to grow at a healthy rate while commercial projects may be showing a slowing trend.

Network information services (NIS) which in 1974 produced $894 million as the most profitable individual industry sector, is expected to grow at an annual rate of 18% and reach $2.409 billion by 1980, the report said.

Software products, on the other hand, which ranked only third in revenues in 1974 with $331 million, is expected to reach $1.351 billion in sales in 1980 for an annual growth rate of 26%, the report predicted.

Software services, which produced $473 million in 1974, will grow 8% annually and hit $732 million by 1980.

Batch services, which ranked second in revenues in 1974, will grow to $1.025 billion by 1980 at a slow 5% annual rate.

Asset Values Up

Despite the national recession last year, the computer services industry reported increases in asset value, net worth and working capital.

The survey also showed batch companies are moving toward NIS, and it predicted a reduction in the share of revenues contributed by batch services.

Companies with annual revenues under $2 million, 70% of which reported batch services as their primary source of revenues, forecasted reductions in excess of 30% by 1977. The shift toward NIS appears evident, the report stated.

Similarly, the sale of software products was shown to be an increasing source of revenue for firms in the $500,000 to $2 million annual revenue range, while software service activities were reported to be declining by all but the smallest size firms, the report noted.

Minicomputers and small business systems were indicated as a major source of concern and competition for the industry, second only to competition from other DP service firms.

Data centers are under the double pressure of competition from NIS companies and small in-house computers, the report said, adding they are, however, indicating an awareness of this problem by diversifying and providing multiple product and service offerings.

Recession Seen Stunting Growth of European DP Mart

By Nancy French
Of the CW Staff

WALTHAM, Mass. — The continuing recession has slowed expected growth in the European computer market this year, and 1976 expectations reflect a "wait and see" policy toward expansion by computer users.

This preliminary conclusion was released by International Data Corp. (IDC) recently as part of a comprehensive study of data processing in Europe's top-500 corporations.

The corporations surveyed account for an estimated 40% to 45% of the entire European DP market and are representative of computer use throughout Europe, the study said.

Users "will content themselves with making more efficient use of equipment already in-house" to cope with immediate economic difficulties they face, the report said.

IDC researchers learned West German users expect to spend 8.9% more on DP hardware, services and personnel in 1976. With an inflation rate of about 6%, most corporations reported increased spending will be for wages rather than hardware additions.

Cost-cutting alternatives are being introduced instead, the report said, and Siemens, a low-cost West German supplier, is making perceptible gains.

French users indicated budget increases up to about 16.1%, but the inflation rate, expected to drive salaries up 14%, will account for much of that gain.

Upgrades vs. Consolidation

While more mainframe upgrades are anticipated in France than in West Germany, some French users are centralizing and consolidating hardware around larger mainframes, IDC said.

The market research firm conducted personal and telephone interviews at 155 French corporations and 191 West German firms plus their divisions and subsidiaries.

The research effort will continue in the UK, the Benelux group, Switzerland, Austria, Italy, Scandinavia and Spain during the remainder of the year.

The IDC study covered 1,153 user sites, 904 of which fell into the category of "manufacturing and other."

Banking installations, the second highest individual sector, numbered 64, or 5.6% of users surveyed. Sixty steel industry DP sites, or 5.2% of installations surveyed, was the third largest industry sector.

Market Share

In both France and West Germany, IBM held the lion's share of the market, the study found.

In France, for example, a survey of 667 sites showed 54% using IBM gear. Second highest was Honeywell Information Systems equipment, used by 13.8% of user installations.

In West Germany, IBM held even a higher proportion of user sites. Of 316 surveyed, 60.1%, or 190 installations, used IBM equipment. Second highest was Siemens, with 16.5% of the market.

European users seemed to favor using peripherals offered by their mainframe manufacturer. However, researchers noted an economizing trend developing within DP departments to using less expensive independent peripherals.

More than one type of data entry is generally in use. The majority of the corporations surveyed still use cards, although most sites also have or are planning to adopt more economical methods such as key-to-disk or key-to-tape, the findings showed.

Data communications is still in limited use in Europe, the survey found. The high cost of both new equipment and telephone lines has prohibited implementation to date, although many users indicated great interest in expansion into this field, the report said.

International News

Exporters Urged to Heed Rules

By Molly Upton
Of the CW Staff

SAN FRANCISCO — "Full attention to and compliance with export control licensing requirements will pay dividends to the prospective exporter," according to Rauer H. Meyer, director of the Office of Export Administration (OEA) at the U.S. Department of Commerce.

Meyer defined the two kinds of licenses and urged attendees at a recent conference here to be sure to fill out the proper forms correctly to expedite consideration of requests.

High-technology products such as computers, semiconductors, oscilloscopes and other electronic instruments comprise the majority of items on the list requiring validated licenses for export to the socialist countries, he said.

Application for a validated license must be made to OEA on a prescribed form, he said, emphasizing that "delays in the issuance of licenses can be avoided by compliance with the requirements."

General Licenses

The other kind of license is a general license. An exporter whose proposed trade qualifies for this category may proceed without filing a license application or obtaining further authorization from the Department of Commerce, he said.

Certain specified types of technical data may be exported under general licenses such as data generally available to the public in any form and scientific or educational data not significantly related to design, production or utilization in industrial processes.

Also included are: data transmitted in connection with filing for a foreign patent; data normally supplied in support of efforts to sell the product; and data necessary to the assembly, installation, maintenance or operation of a commodity authorized for export, he said.

Specific conditions defining and limiting each of the above generalizations are given in the export administration regulations.

All other technology exported to the socialist countries requires a validated license, he said.

Licensing Considerations

When reviewing applications for a license, OEA considers whether the transaction "would make a significant contribution to the military potential" of any other nation that would prove detrimental to the national security of the U.S.," he said.

A prime consideration is the end use of the product. In most cases, it is necessary to document the foreign parties' intentions as to use, on special consignee statement forms prescribed by the Department of Commerce for this purpose, he said.

Also, technical details of the commodity and pertinent commercial aspects of the transaction "are essential to an expeditious and proper consideration of the application," he said. This would entail identification of the foreign purchasers and any intermediate parties, he explained.

Intel Officer Says

Filing Patents Abroad Essential Process

By Molly Upton
Of the CW Staff

SAN FRANCISCO – Don't be stingy when it comes to paying fees on file patents and trademarks abroad, Roger S. Borovoy said at a conference here recently.

Although the patent process can be expensive, neglecting this aspect of launching a product can result in losing foreign rights to the invention, the vice-president and general counsel of Intel Corp. said.

Firms should file for patents abroad within a year of the U.S. filing date, otherwise the foreign patent rights may be lost forever, he said.

If, after a couple of years, the invention becomes less important, a firm can abandon the application in some countries and thereby cut costs, Borovoy said.

File in Major Countries

U.S. firms should file in the major European countries, he said, as the product is likely to be manufactured in one of these. Royalty can be collected where the product is made, even though it is subsequently sold in a country where there are no patent rights, he said.

Consideration should be given to filing for patents in the Eastern Bloc countries, although it is unknown how effective such measures are, Borovoy said.

"It is a bit like dropping pennies into a well. You know the pennies are at the bottom, but you don't quite know what value they have down there – and you cannot retrieve them," he said.

There is a proposal for a common market patent, which might be acted on next year, he said. This would save U.S. firms money and allow for only one filing, Borovoy added.

Some countries require a firm to grant licenses on its patent if that firm is not "working the invention" in that particular country. This policy would allow licensees to sell, manufacture or both, he said.

Licensing has two forms: granting either the patent rights alone or the know-how to manufacture the product along with the patent.

In general, it is harder to sell the former, Borovoy said.

Licenses for know-how bring in more money, but also have hidden costs, involving making the know-how available, he said. Generally this requires time and effort as well as travel by key people within the organization.

International News

The U.S. firm must be sure the license specifies that the licensee must keep the know-how confidential. All documents must be properly marked and sufficient logs kept, which requires careful attention and clerical time, he remarked.

In licensing patents, there are two primary ways of collecting royalties: a running royalty or a paid-up license with fixed periodic payments.

A paid-up license is more popular generally, as the licensee tends to be optimistic regarding his volume of business, Borovoy said. The running royalties require detailed reporting of sales that give the licenser key information on sales and product breakdown.

Manufacturing Rights

Although a firm can give a licensee the exclusive rights to manufacture in a particular European country, normally licensees require the nonexclusive right to market the product anywhere in Europe, he said.

"Very few companies in Europe are willing to confine their sales to their own country," he observed.

But, in spite of licensing to market in explicit countries, if a licensee sells the product to a third party in that country, the third party is free to resell the product anywhere in the world, Borovoy said.

Sublicense Incentives

To gain wider sales, the U.S. firm could give the licensee the right to grant sublicenses. Generally, the majority of the royalty would go to the inventor, with a substantial part to the licensee to give him incentive to grant sublicenses, he suggested.

In Japan, it is especially important to obtain patents on electronic inventions, he said. "There is a distinct advantage in obtaining licensing assistance from a major Japanese company which has both an interest in your particular product and a financial interest in successful licensing," he said.

Trademarks also should be filed early in all the important countries, he said. "Much costly litigation has resulted from neglect by American companies to diligently file their trademarks abroad."

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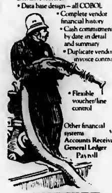

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Pertec '75 Net Increases 120%

EL SEGUNDO, Calif. – Pertec Corp. posted earnings 120% greater than last year on revenues only 46% ahead, setting a new record, according to Ryal R. Poppa, president and chief executive officer.

In addition to the "excellent" results for the fiscal year, ended June 27, the computer peripheral equipment manufacturer's fourth quarter was also the best period in the company's history, the firm said.

Revenues of $13.5 million were realized for the fourth quarter and $48 million for the 12 months. This compared with $9.5 million and $33 million for the same period last year.

Earnings per share were 31 cents for the fourth quarter and 90 cents for the 12-month period. This compared with 29 cents per share and 41 cents per share recorded in 1974. The 29 cents per share, however, included a gain of 22 cents from the sale of the company's computer output microfilm (COM) operation.

"This year's achievement marks a significant turnaround after three years of progressively declining profits," Poppa said.

"More important, however, was the excellent profit contributions" of two divisions despite a weak economy. The Business Systems Division which was unprofitable last year recorded dramatic increases in both revenues and profits, Poppa said.

"Our Peripheral Equipment Division, which experienced a modest growth rate of 12%, well below its anticipated revenues, was still able to achieve almost 100% of its profit expectations.

"In view of this, we are confident we have attained the turnaround predicted in previous announcements," Poppa added.

MDS Reports Earnings Up For First Fiscal Quarter

PARSIPPANY, N.J. – Mohawk Data Sciences Corp. (MDS) reported a net income of $2 million, or 30 cents a share for the first quarter, which included $685,000 of foreign net operating loss carryforwards, for the first fiscal quarter ended July 31.

This compared with a net loss of $1.9 million or 32 cents a shere for the same period last year.

The $2 million first-quarter total net income compared with a net loss of $6.8 million for the same year-ago period.

Revenues for the quarter were $41 million, down from $43 million reported a year ago.

Ralph H. O'Brien, chairmen and president, said the reduction in quarter revenues was largely the result of a planned withdrawal from certain OEM and component markets. However, he also noted that interest expenses for the first quarter were below that of the same year-ago period and reflected a reduced level of borrowing and an improvement in interest rates and operating expenses resulting from the company's consolidation program.

Record Income Reported at ACT

NEW YORK – Advanced Computer Techniques Corp. (ACT) scored its most successful year with earnings of $282,210 or 24 cents a share, an 81% increase over the 1974 figure of $155,674 or 18 cents a share.

"While the company has achieved a record figure, it would like to do even better and we are continuing to formulate plans to do so," President Charles P. Lecht said.

"We are established in a number of marketplaces and feel confident we can successfully overcome the global economic uncertainties which may prevail during 1975/1976," he said.

Orders & Installations

The Naval Surface Weapons Center, Dahlgren Laboratory, has ordered a Control Data Corp. Cyber 70 to support the Fleet Ballistic Missile program.

The Minneapolis Police Department has purchased 35 mobile digital communications terminals from Kustom Data Communications, Inc. to enhance law enforcement communications.

Citizens Federal Savings and Loan Association of Dayton, Ohio, has ordered an on-line system from NCR which includes a Century 251 computer, 23 NCR 270 electronic teller terminals and 11 NCR 796 visual display terminals.

Seven Digital Equipment Corp. PDP-15/78 computer graphics systems have been ordered by Bell Telephone Laboratories.

Raygo, Inc. has installed a 48K NCR Century 101 and three visual display terminals to help control manufacturing operations.

The Federal Home Loan Bank of Chicago has installed a Burroughs B7700 to take over DP services for 150 savings and loan associations.

Johnson City, Iowa has ordered a Hewlett-Packard mini data center system to manage administrative functions.

Home Savings and Loan Association of Los Angeles has ordered 300 Olivetti TC 800 terminals for installation after the completion of a pilot installation starting in October.

First National Bank of Omaha has installed 18 NCR 279 financial teller terminals in 14 Safeway supermarkets and four Richman-Gordman department stores as part of a network of customer service terminals.

The Bank of New Orleans and Trust Co. has ordered a Burroughs B776 system and communications processor and 20 SS100 systems for a centralized proof and transit operation.

Electric Service & Supply Co. has ordered a Univac 90/30 to implement an on-line order entry system.

Earnings Reports

CODEX
Three Months Ended June 30

	1975	1974
Shr Ernd	$.76	$.73
Revenue	8,711,000	5,198,000
Tax Cred	.....	88,000
Earnings	1,172,000	1,070,000
9 Mo Shr	2.22	2.00
Revenue	19,040,000	12,354,000

INTERCONTINENTAL COMPUTING
Three Months Ended June 30

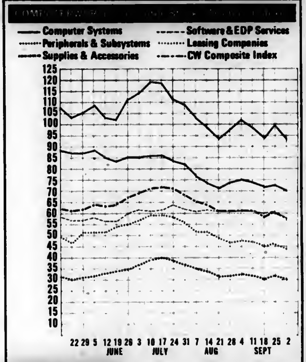
	1975	1974
Shr Ernd	$.03	$.03
Revenue	757,772	912,308
Earnings	34,191	39,141
6 Mo Shr	.09	.04
Revenue	1,580,839	1,580,440
Earnings	110,249	48,988

ACADEMY COMPUTING
Six Months Ended June 30

	1975	1974
Shr Ernd	$.06	$.04
Revenue	428,464	341,794
Earnings	85,797	55,286

INFORMATION INTERNATIONAL
Three Months Ended July 31

	1975	1974
Shr Ernd	$.19	$.18
Revenue	3,308,878	2,531,348
Earnings	477,746	449,013



STANDARD COMPUTER
Six Months Ended June 30

	1975	1974
aShr Ernd	$.05	$.59
Revenue	2,970,000	3,204,000
Earnings	28,000	357,000

a-Per-share earnings computed after adjustment for reverse stock split of one for 7.5 shares effective May 28, 1975.

SYNCOM
Three Months Ended June 30

	1975	1974
Shr Ernd	$.02	.....
Revenue	818,288	$615,608
Earnings	26,841	(30,891)

NASHUA
Three Months Ended June 27

	1975	a1974
Shr Ernd	$.06	$.90
Revenue	80,918,000	83,730,000
Earnings	280,000	4,149,000
6 Mo Shr	.39	1.50
Revenue	155,197,000	155,025,000
Spec Cred	b1,368,000	.....
Earnings	1,821,000	8,922,000

a-Restated to reflect Lifo method of valuing inventories. b-Cumulative effect on prior years from accounting change.

COMPUDYNE
Three Months Ended June 30

	1975	a1974
Shr Ernd	$.04	$.01
Revenue	9,739,644	7,713,731
Earnings	192,134	94,304
9 Mo Shr	.09	.02
Revenue	29,906,595	22,187,426
Earnings	463,745	223,299

a-Restated to reflect change to Lifo accounting method.

ADAGE
Three Months Ended June 28

	1975	1974
Shr Ernd	$.41	$.07
Revenue	1,598,959	1,153,046
Spec Cred	210,000	14,000
Earnings	325,299	53,690

DATATAB
Three Months Ended June 30

	1975	1974
Shr Ernd	.....	$.04
Revenue	$1,078,219	1,254,954
Tax Cred	71,700	.....
Earnings	(67,120)	30,881
6 Mo Shr	.....	.11
Revenue	2,236,265	2,507,394
Tax Cred	71,000	.....
Earnings	(65,657)	82,575

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCTOBER 1, 1975

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1975 RANGE (1)	CLOSE OCT 1 1975	WEEK NET CHNGE	WEEK PCT CHNGE
N	BURROUGHS CORP	62-109	86 3/8	-3 3/8	-3.7
O	COMPUTER AUTOMATION	2- 13	8 1/4	-1 1/2	-15.3
N	CONTROL DATA CORP	11- 23	16 5/8	+ 1/4	+1.5
N	DATA GENERAL CORP	10- 39	28 1/8	-2 7/8	-9.2
O	DATAPOINT CORP	4- 26	23	-1 1/4	-5.5
O	DIGITAL COMP CONTROL	1- 4	2 1/2	0	0.0
N	DIGITAL EQUIPMENT	46-122	111 3/4	-8	-6.6
N	ELECTRONIC ASSOC.	2- 3	2 1/4	- 1/2	-18.1
A	ELECTRONIC ENGINEER.	8- 10	8 3/4	+ 1/8	+1.4
N	FOXBORO	23- 42	24 3/4	-1 1/2	-5.7
O	GENERAL AUTOMATION	6- 14	6 3/8	- 3/8	-5.5
O	GRI COMPUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARD CO	85-123	94 3/8	-2	-2.3
N	HONEYWELL INC	22- 40	27 5/8	-1 1/4	-4.3
N	IBM	158-224	193 5/8	-7 5/8	-3.9
O	MEMOREX	1- 13	6 5/8	- 1/2	-7.0
O	MICRODATA CORP	2- 6	5 3/4	+ 1/8	+2.2
O	MODULAR COMPUTER SYS	5- 19	11 1/2	-2	-14.8
N	NCR	15- 39	24 3/4	- 3/4	-2.9
O	PRIME COMPUTER INC	2- 6	4 3/4	0	0.0
N	PERKIN-ELMER	16- 30	22 1/8	- 3/4	-3.2
N	RAYTHEON CO	26- 55	49 3/4	-4 3/4	-8.7
N	SINGER COMPANY	13- 17	11	- 1/2	-4.3
N	SPERRY RAND	26- 49	35 3/4	-1 1/2	-3.7
A	SYSTEMS ENG. LABS	1- 5	3 1/8	- 1/4	-7.4
N	VARIAN ASSOCIATES	7- 18	13 3/8	-1 3/8	-9.5
N	WANG LABS.	7- 17	9 1/4	-1 3/4	-15.9
N	XEROX CORP	51- 86	53 1/4	- 3/4	-1.3

LEASING COMPANIES

EXCH		1975 RANGE (1)	CLOSE OCT 1 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMDISCO INC	1- 5	3 3/8	- 1/4	-6.8
A	COMMERCE GROUP CORP	2- 4	2 1/2	- 1/8	-4.7
A	COMPUTER INVSTRS GRP	1- 2	5/8	-	-9.1
N	DATRONIC RENTAL	1- 1	1/2	0	0.0
A	DCL INC	0- 1	1/2	0	0.0
N	DPF INC	3- 6	4 1/2	- 1/4	-5.2
O	EDP RESOURCES	1- 2	1	0	0.0
A	GRANITE MGT	1- 5	4 1/8	0	0.0
A	GREYHOUND COMPUTER	2- 3	2 7/8	- 1/8	-4.1
A	ITEL	3- 9	5 5/8	- 7/8	-13.4
N	LEASCO CORP	4- 9	6 1/2	+ 1/8	+1.9
O	LEASPAC CORP	1- 1	1/4	0	0.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	NBG INC	0- 4	5/8	- 1/8	-16.6
A	PIONEER TEX CORP	2- 7	5 1/8	+ 1/8	+7.5
A	ROCKWOOD COMPUTER	1- 1	1/4	0	0.0
N	U.S. LEASING	7- 14	6 1/2	- 3/4	-10.3

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		1975 RANGE (1)	CLOSE OCT 1 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 1	3/4	- 1/8	-14.2
A	APPLIED DATA RES.	1- 10	1 5/8	- 1/8	-7.1
N	AUTOMATIC DATA PROC	29- 65	47	-3	-6.0
O	BRANDON APPLIED SYST	1- 1	1/8	0	0.0
O	CENTRAL DATA SYSTEMS	3- 7	7 1/4	+ 1/8	+1.7
O	COMPUTER DIMENSIONS	2- 6	3	0	0.0
O	COMP ELECTION SYSTMS	3- 4	4 3/4	- 1/4	-5.0
O	COMPUTER HORIZONS	1- 1	7/8	- 1/8	-12.5
O	COMPUTER NETWORK	1- 3	2 5/8	0	0.0
N	COMPUTER SCIENCES	2- 6	5	- 1/8	-2.4
O	COMPUTER TASK GROUP	1- 1	5/8	0	0.0
O	COMPUTER USAGE	2- 4	2	- 1/8	-5.8
O	COMSHARE	3- 4	2 5/8	+ 1/8	+5.0
O	DATATAB	1- 2	1 1/8	- 1/4	-18.1
A	ELECT COMP PROG	1- 1	1/4	0	0.0
N	ELECTRONIC DATA SYS.	12- 25	15 1/2	- 7/8	-5.3
O	INFONATIONAL INC	1- 1	1/8	0	0.0
O	IPS COMPUTER MARKET.	1- 1	5/8	0	0.0
O	KEANE ASSOCIATES	2- 3	2	0	0.0
O	KEYDATA CORP	2- 3	2	- 3/8	-15.7
O	LOGICON	3- 5	3 3/4	0	0.0
A	MANAGEMENT DATA	1- 5	1 3/4	- 1/8	-6.6
O	NATIONAL CSS INC	6- 14	11 1/4	- 5/8	-5.2
O	NATIONAL COMPUTER CO	1- 1	1/8	0	0.0
A	ON LINE SYSTEMS INC	5- 17	11	- 1/8	-1.1
N	PLANNING RESEARCH	2- 6	3 3/4	0	0.0
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	RAPIDATA INC	2- 5	2 5/8	- 1/2	-16.0
O	REYNOLDS & REYNOLD	13- 24	12 1/2	-1	-7.4
O	SCIENTIFIC COMPUTERS	1- 1	1	0	0.0
O	SIMPLICITY COMPUTER	1- 1	1 1/4	0	0.0
O	TYMSHARE INC	7- 21	16 1/4	-1 3/4	-9.7
A	URS SYSTEMS	2- 4	5	- 1/4	-7.6
N	WYLY CORP	2- 4	3 1/8	+ 1/8	+4.1

PERIPHERALS & SUBSYSTEMS

EXCH		1975 RANGE (1)	CLOSE OCT 1 1975	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	4- 9	7 3/8	0	0.0
O	ADVANCED MEMORY SYS	1- 7	5 1/4	+ 3/8	+7.6
N	AMPEX CORP	3- 7	5 3/8	- 1/4	-4.4
O	ANDERSON JACOBSON	1- 3	1 7/8	0	0.0
O	BEEHIVE MEDICAL ELEC	1- 5	3 1/2	+ 1/8	+3.7
A	BOLT, BERANEK & NEW	9- 13	9 1/4	- 5/8	-6.3
N	BUNKER-RAMO	4- 5	4 5/8	- 1/8	-2.6
A	CALCOMP	4- 7	3 5/8	- 5/8	-9.3
O	CAMBRIDGE MEMORIES	2- 5	2 3/8	0	0.0
N	CENTRONICS DATA COMP	7- 25	15	-3	-16.6
O	CODEX CORP	15- 35	50	-6 1/2	-17.3
O	COGNITRONICS	1- 2	5/8	- 3/8	-37.5
O	COMPUTER COMMUN.	1- 2	3/4	0	0.0
O	COMPUTER CONSOLES	3- 7	4 1/4	0	0.0
A	COMPUTER EQUIPMENT	1- 2	1 5/8	- 1/4	-13.3
O	COMPUTER MACHINERY	1- 2	1 1/8	- 1/8	-10.0
O	COMPUTER TRANSCEIVER	1- 2	3/4	- 3/8	-33.3
O	COMTEN	2- 5	2 7/8	0	0.0
N	CONRAC CORP	12- 23	18	-1 1/4	-6.4
O	DATA ACCESS SYSTEMS	1- 3	2	0	0.0
O	DATA 100	5- 16	8 5/8	- 5/8	-6.7
A	DATA PRODUCTS CORP	2- 6	3 5/8	- 3/8	-9.3
O	DATA TECHNOLOGY	1- 3	1 3/4	0	0.0
O	DATUM INC	1- 2	1 1/8	- 1/8	-10.0
O	DECISION DATA COMPUT	4- 7	3 7/8	- 3/8	-8.8
O	DELTA DATA SYSTEMS	1- 1	1/4	+ 1/8	+100.0
O	DI/AN CONTROLS	1- 1	3/4	0	0.0
N	ELECTRONIC M & M	1- 3	1 1/2	- 1/4	-14.2
O	FABRI-TEK	1- 1	7/8	0	0.0
O	GENERAL COMPUTER SYS	1- 2	1	0	0.0
N	HAZELTINE CORP	3- 6	5 3/4	- 1/4	-4.2
N	HARRIS CORP	19- 28	22 1/4	+ 1/4	+1.1
A	INCOTERM CORP	3- 12	9 3/8	- 1/2	-5.0
O	INFOREX INC	2- 5	2 1/4	- 3/8	-14.2
O	INFORMATION INTL INC	8- 14	13 3/4	+ 3/8	+3.6
A	LUNDY ELECTRONICS	3- 3	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	3/8	0	0.0
A	MILGO ELECTRONICS	8- 24	14 1/2	-2 5/8	-15.3
N	MOHAWK DATA SCI	1- 5	3 1/8	- 1/2	-13.7
O	OPTICAL SCANNING	1- 3	2 5/8	- 3/8	-12.5
O	PENRIL CORP	2- 2	1	- 1/8	-11.1
O	PERTEC CORP	2- 9	4 3/8	+ 1/8	+2.9
A	POTTER INSTRUMENT	2- 7	1 3/4	0	0.0
O	PRECISION INST.	1- 1	1/2	- 1/8	-20.0
O	QUANTOR CORP	2- 6	4 1/2	- 1/2	-10.0
O	RECOGNITION EQUIP	2- 9	4 7/8	- 3/8	-6.9
N	SANDERS ASSOCIATES	3- 11	7 1/8	- 1/2	-6.9
O	SCAN DATA	1- 3	1 5/8	- 1/8	-7.1
O	STORAGE TECHNOLOGY	6- 17	12	- 5/8	-4.9
O	SYCOR INC	5- 19	12 1/2	-1	-7.4
O	T BAR INC	3- 6	4 1/4	+ 1/4	+6.1
O	TALLY CORP.	1- 5	3	- 1/4	-7.6
O	TEC INC	1- 4	2 3/4	- 1/4	-8.3
N	TEKTRONIX INC	18- 41	37 3/8	+ 5/8	+1.6
N	TELEX	1- 3	2 1/8	0	0.0
O	WANGCO INC	4- 9	5	- 1/4	-4.7
O	WILTEK INC	1- 4	2 1/2	0	0.0

SUPPLIES & ACCESSORIES

EXCH		1975 RANGE (1)	CLOSE OCT 1 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	4- 5	4 1/2	- 1/4	-5.2
A	BARRY WRIGHT	5- 7	6	- 1/8	-2.0
O	CYBERMATICS INC	0- 1	3/8	0	0.0
A	DATA DOCUMENTS	29- 42	32	- 1/2	-1.5
O	DUPLEX PRODUCTS INC	12- 25	15 1/8	- 3/8	-2.4
N	ENNIS BUS. FORMS	5- 7	4 7/8	- 1/8	-2.5
O	GRAHAM MAGNETICS	5- 10	7 3/4	- 3/4	-8.8
O	GRAPHIC CONTROLS	8- 21	11 1/4	-2 1/4	-16.6
N	3M COMPANY	43- 65	49 5/8	-4 3/8	-8.1
O	MOORE CORP LTD	39- 51	43 1/4	-1 3/4	-3.8
N	NASHUA CORP	11- 22	11 3/4	- 1/4	-2.0
O	STANDARD REGISTER	11- 20	15 1/2	- 3/4	-4.6
O	TAB PRODUCTS CO	4- 8	6	0	0.0
N	UARCO	17- 24	18 1/4	- 3/4	-3.9
O	VANTER GRAPHICS CORP	4- 7	4 1/2	0	0.0
A	WABASH MAGNETICS	3- 5	3 7/8	+ 1/8	+3.3
N	WALLACE BUS FORMS	15- 25	16 1/4	- 1/4	-1.5

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